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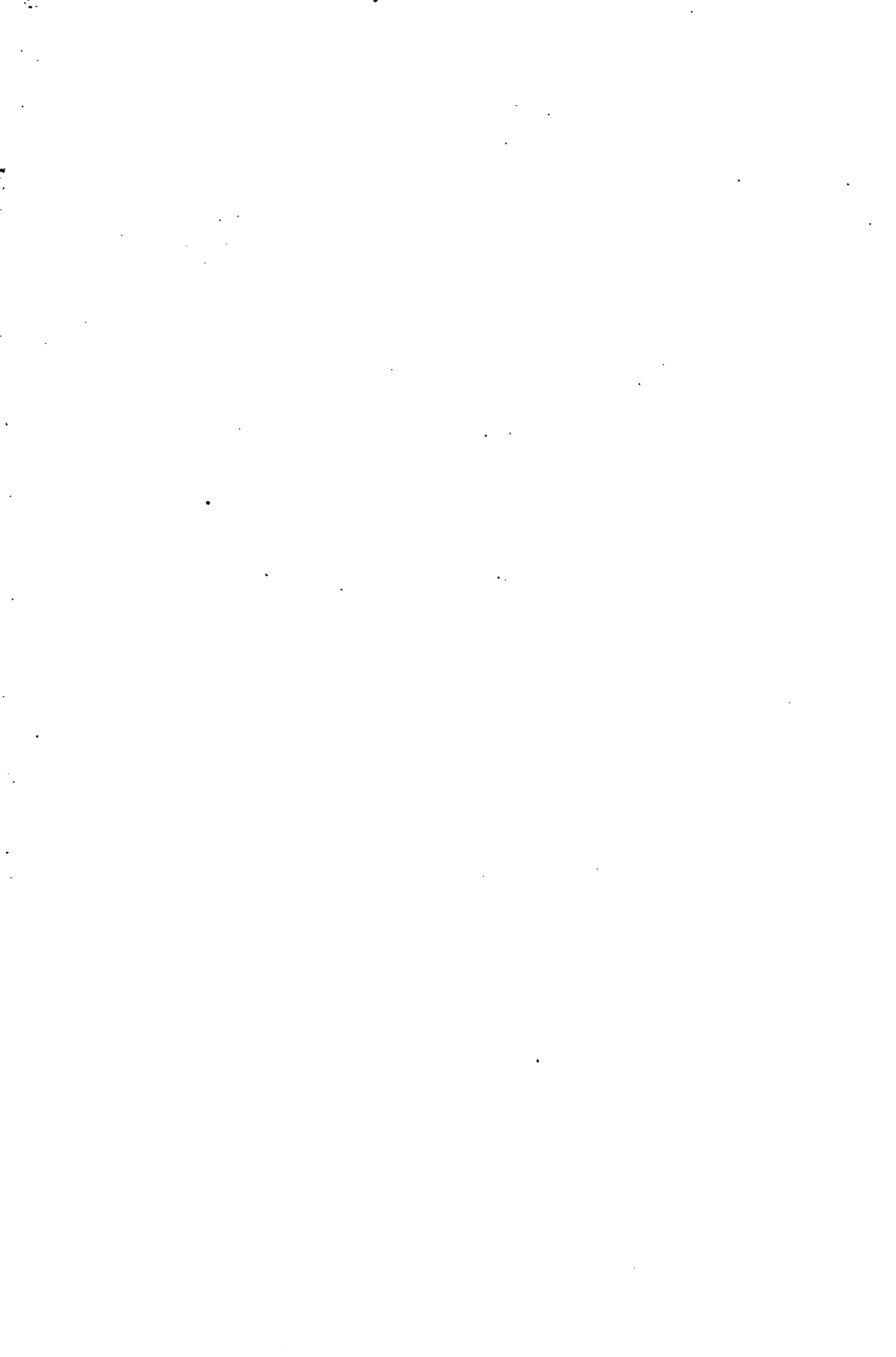
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R. M. 12





PILCHER PRIVATE HOSPITAL—THE GRAND AVENUE ELEVATION.
CORNER OF GATES AND GRAND AVENUES, BROOKLYN, N. Y.



THE PILCHER PRIVATE HOSPITAL.
GATES AVENUE, CORNER OF GRAND AVENUE, BROOKLYN, N. Y.

YEAR-BOOK

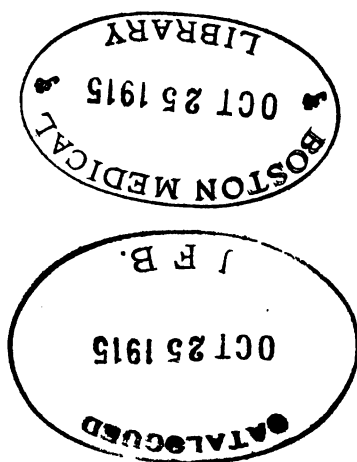
OF THE

PILCHER HOSPITAL

**FOR THE PERIOD FROM APRIL 1, 1913
TO DECEMBER 31, 1914**

**BEING THE FOURTH AND FIFTH YEARS OF THE OPERATION
OF THE HOSPITAL**

145 GATES AVENUE
CORNER OF GRAND AVENUE
BROOKLYN NEW YORK
1915




PRESS OF
J. B. LIPPINCOTT COMPANY
PHILADELPHIA

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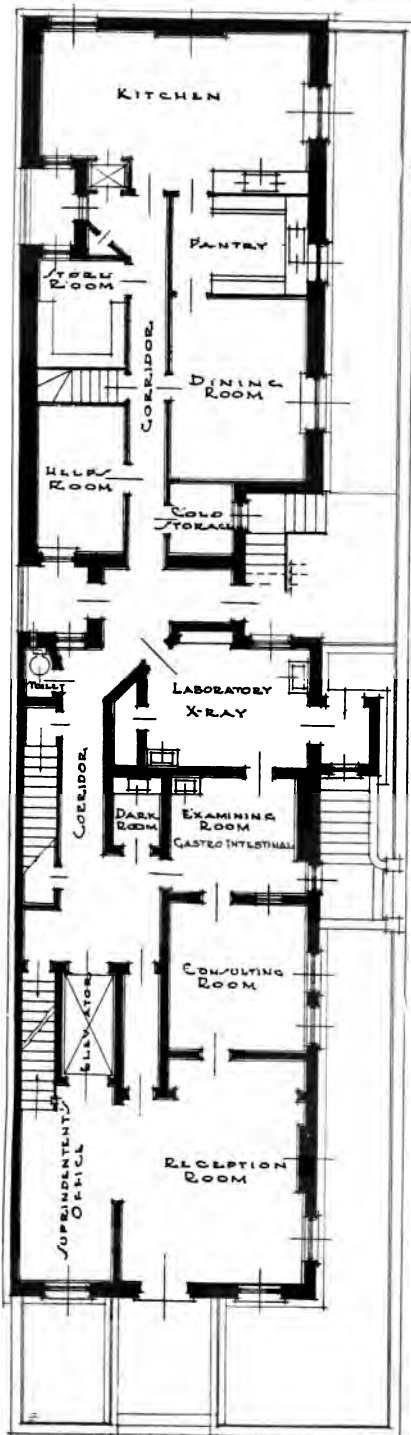
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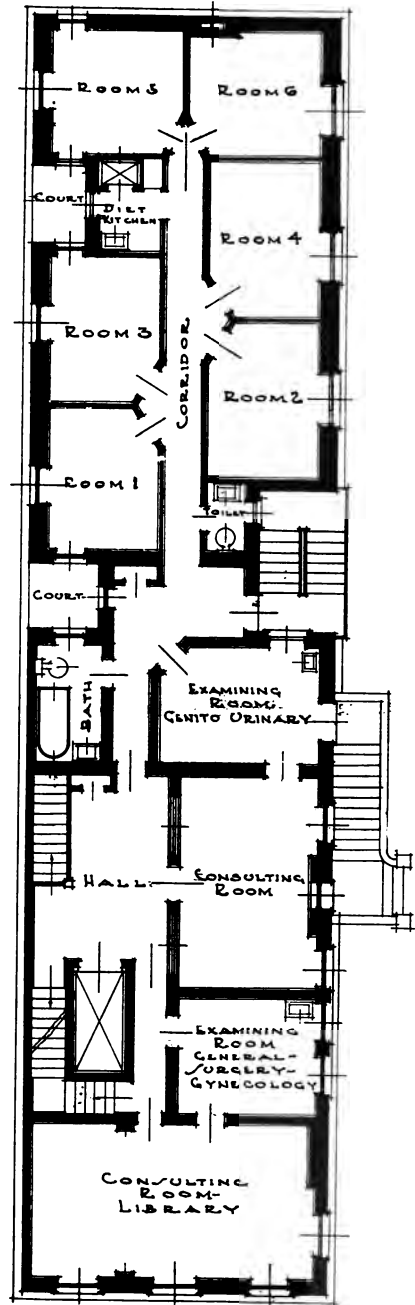
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FIG. 1.

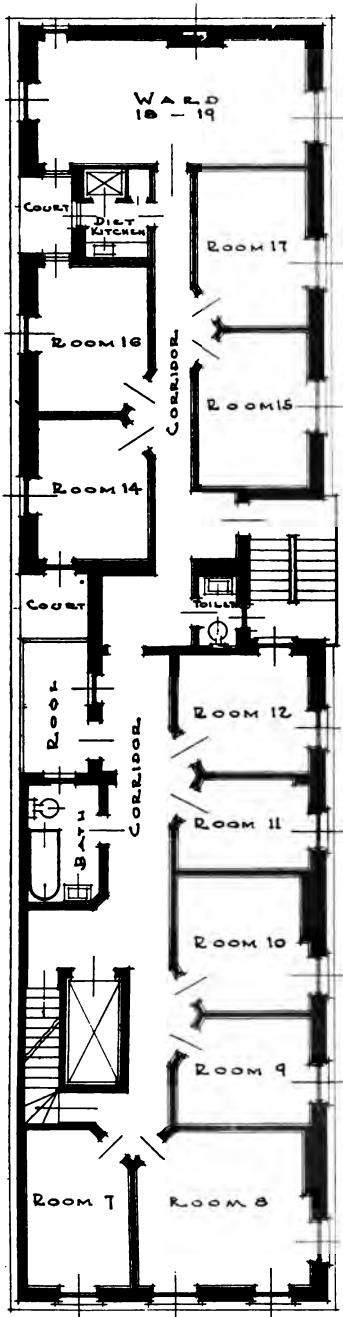


Basement plan.
Gates Avenue.

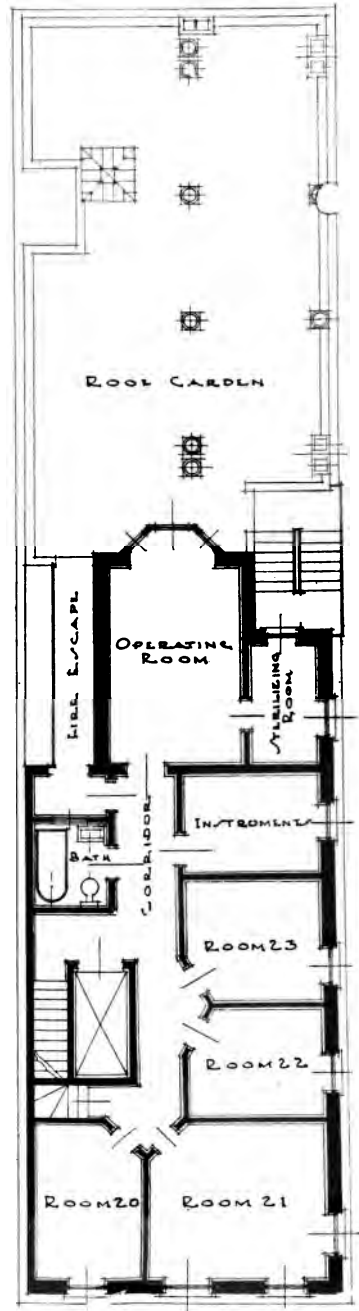


First floor plan.

FIG. 2.



Second floor plan.



Third floor plan.



FOURTH YEAR-BOOK OF THE PILCHER HOSPITAL.

COVERING THE PERIOD FROM APRIL 1, 1913, TO DECEMBER 31,
1914, TWENTY-ONE MONTHS.

INTRODUCTORY.

DURING the period covered by the present report, 337 patients were treated in this hospital. Owing to the increase in the number of rooms available for patients, which were completed early in 1913, relief has been enjoyed from the former frequent embarrassment caused by the supply of rooms being inadequate to the demand. But the greatest relief has been felt in the more satisfactory provisions for diagnostic examinations and for therapeutic work which the increased room has given. Dr. Paul Pilcher has given more formal expression to this in his reports on the very happy results which have attended his work with obstructing prostates and with bladder tumors. The report by Dr. James Pilcher on the X-ray work is in the same vein. The great utility of the Röntgen ray in confirming and modifying diagnosis in cases of intrathoracic or intra-abdominal diseases, as well as in cases of diseases of bones or of the kidney and bladder, has been a daily experience. It has been possible to set aside a room for electro-therapeutics, in which is also installed a capacious cabinet for the illumination of X-ray plates in series. Another room has been devoted to the electrical apparatus for hot-air bakings. The desire for and the importance of the labor of an artist for making drawings of conditions and specimens developed in operative work has caused us to set aside a room for a studio, and the establishment therein of a pupil of Broedel's as our artist assistant.

The more full equipment of the roof garden has proven most acceptable to convalescent patients. The use to which it has been daily put has demonstrated its importance in the plan of such an institution as this.

The following operations have been performed during the period under review :

I. *Head, Face and Neck:*

Abscess, Follicular, of Eyelids; Incision.....	1
Abscess, Alveolar, Periostitis; Incision.....	1
Abscess, Cervical Adenitis; Incision.....	3
Abscess, Cellulitis of Hand and Neck; Incision.....	1
Abscess, Infected Sebaceous Cyst; Extirpation.....	1
Epithelioma of Nose, Cheek or Auricle; Cauterization by Oudin Current.....	5
Carcinoma of Cheek, Buccal Surface; Cauterization by D'Arsonval Current.....	1
Carcinoma of Tonsil and Tongue; Oudin Current and Radium	1
Carcinoma of Temporal Bone; Radium.....	1
Adenosarcoma of Neck; Excision.....	1
Papillomata; Excision and Cauterization.....	4
Sebaceous Cyst; Excision.....	3
Adenoids of Pharynx and Hypertrophied Tonsils; Enucleation	7
Cleft Palate; Staphylorrhaphy.....	4
Tuberculosis of Cervical Lymph-nodes; Excision....	5
Goitre; Partial Thyroidectomy.....	2
Dislocation of Second Cervical Vertebra; Reduced..	1
Lacerated Wound of Face; Sutured.....	3
Fracture of Base of Skull, with Intracerebral Hemorrhage	1
Deforming Scar of Face; Plastic.....	1
Dysphagia from Tubercular Ulcer of Epiglottis; Systematic Cocainization.....	1
Tic Douloureux; High Frequency Current.....	1
	<hr/>
	49

II. *Thorax:*

Abscess of Breast; Incision.....	1
Carcinoma of Breast; Ablation, including Underlying Pectoral Muscles and Axillary Evidement, <i>en bloc</i> ..	12

INTRODUCTORY.

9

Fibroma of Breast; Excision.....	4
Cyst Adenoma of Breast; Total Excision of Breast..	2
Cyst Adenoma of Breast; Partial Excision of Breast	1
Fibroma of Thorax Wall; Excision.....	1
Chondrofibroma of Axilla; Excision.....	1
Sarcoma of Dorsal Vertebrae; Serum.....	1
Sarcoma of Mediastinum; Serum.....	1

24

III. *Abdomen:*

Abscess of Abdominal Wall; Incision.....	1
Papilloma of Abdominal Wall; Electrocautery.....	1
Appendix; Extirpation of, for Acute Inflammation without Intraperitoneal Pus.....	1
Appendix; Extirpation of, for Acute Inflammation with Pus, Localized or Free.....	4
Appendix; Extirpation of, for Chronic Obliterative Inflammation	25
Cirrhosis of Liver with Ascites; Paracentesis.....	1
Cyst of Liver; Partial Excision, Marsupialization, Iodine Injections	1
Obstruction of Bowel by Carcinoma of Descending Colon; Colostomy	1
Obstruction of Bowel by Chronic Ulcerative Prolifera- tive Colitis; Resection of Sigmoid Loop.....	1
Obstruction of Bowel by Adherent Omental Band; Laparotomy and Division of Band.....	1
Obstruction of Bowel by Intraperitoneal Tuberculosis; Colostomy	1
Membranous Pericolitis; Division of Bands and Plastic Suture.....	7
Cæcum Mobile; Fixation by Suture.....	3
Chronic Cholecystitis; Cholecystostomy Drainage....	4
Chronic Cholecystitis with Gall-stones; Cholecystotomy with Removal of Calculi.....	7
Chronic Cholecystectomy.....	2

Ulcer of Stomach; Gastro-enterostomy.....	2
Ulcer of Stomach; Division of Adhesions, Infolding..	1
Ulcer of Stomach; Resections of Pylorus, Gastro- enterostomy	1
Ulcer of Duodenum; Gastro-enterostomy.....	2
Carcinoma of Stomach and Œsophagus; Gastrostomy	1
Carcinoma of Stomach; Exploratory Incision.....	2
Carcinoma of Stomach; Gastrectomy, Gastro-enter- ostomy	1
Hepato-gastrocoloptosis; Hepatopexy, Fixation of Colon	1
Hernia, Inguinal; Radical Cure	6
Hernia, Strangulated; Herniotomy and Radical Cure.	1
	—
	79

IV. *Ovaries and Tubes:*

Tubal Pregnancy (Ruptured); Laparotomy and liga- ture	1
Tubal Pregnancy (Encysted); Laparotomy and Salpingectomy	2
Salpingo-ovaritis, Chronic; Ovario-salpingectomy....	1
Ovarian Cystoma (Twisted Pedicle); Ovariectomy..	1
Ovarian Cystoma (Intraligamentous), Enucleation and Removal.....	1
Ovarian Microcysts; Cuneiform Excision.....	2
	—
	8

V. *Uterus and Vagina:*

Myoma of Uterus; Transabdominal Myomectomy...	6
Myoma of Uterus; Hysterectomy.....	3
Carcinoma of Uterus; Vaginal Hysterectomy.....	1
Chronic Endometritis; Curettage.....	2
Retained Degenerated Ovum; Curettage.....	1
Retroversion; Intraperitoneal Plication of Round Ligaments	4

INTRODUCTORY.

II

Laceration of Cervix Uteri; Trachelorrhaphy.....	3
Laceration of Perineum; Perineorrhaphy.....	5
Procidentia Uteri; Interposition (Watkins-Wertheim)	I
Procidentia Uteri; Ventral Fixation.....	I
Urethral Caruncle (Female); Excision.....	I
Urethral Caruncle (Female); Destruction by Cautery	3
Carcinoma of Vaginal Vault (Recidive after Hyster- ectomy); Radium.....	I

32

VI. *Kidneys and Bladder:*

Ptois of Kidney; Nephropexy.....	I
Renal Varix; Nephrotomy.....	I
Tuberculosis of Kidney; Nephrectomy.....	2
Pyonephrosis, Ureterovaginal Fistula; Nephrectomy	I
Stone in Kidney; Pyelolithotomy.....	I
Stone in Ureter; Suprapubic Cystotomy, Cautery Divi- sion of Ureteral Meatus.....	I
Stone in Bladder; Suprapubic Lithotomy.....	3
Stone in Bladder; Litholapaxy.....	I
Stone in Bladder with Prostatic Obstruction; Supra- pubic Lithotomy.....	5
Carcinoma of Bladder; Suprapubic Cystotomy, High Frequency Current Desiccation and Cauterization	5
Carcinoma of Bladder; Desiccation by High Fre- quency Current Through Cystoscope.....	2
Carcinoma of Bladder; Radium Exposures.....	I
Carcinoma of Bladder; Resection after Suprapubic Cystotomy	I
Obstructive Hypertrophy of Prostate; Suprapubic Cystotomy	2
Obstructive Hypertrophy of Prostate; Suprapubic Cystotomy with Intravesical Enucleation of the Prostate	19
Carcinoma of Prostate; Suprapubic Cystotomy with Intravesical Removal of Prostate.....	6

Carcinoma of Prostate and Bladder; Suprapubic Cystotomy, High Frequency (D'Arsonval Spark) Cauterization and Desiccation.....	I
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VII. *Testis, Urethra, Penis:*

Teratoma of Testis; Orchidectomy with Evidement of Inguinal Lymph-nodes.....	I
Tuberculosis of Epididymis; Epididymectomy and Vasectomy	2
Hydrocele of Tunica Vaginalis Testis; Paracentesis...	2
Stricture of Urethra; Internal Urethrotomy.....	I
Perineal Abscess (Periprostatic); Incision.....	I
Perineal Urinary Fistula; Dilatation of Urethra and Curettage of Fistulous Tract	I

 8

VII. *Lumbar and Anal Regions:*

Lumbar Abscess; Incision.....	2
Hemorrhoids; Excision and Suture.....	6
Ischiorectal Abscess; Incision.....	I
Fistula in ano; Division of Sphincter with Excision of Fistulous Tract	I
Incompetence of Anal Sphincter; Plastic Reunion....	I

 II

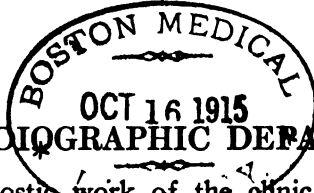
IX. *Extremities:*

Sarcoma of Humerus; Excision.....	I
Sarcoma of Humerus, Recidive; Excision, Radium..	I
Keloid of Shoulder; Excision, Radium.....	I
Neuroma of the Long Saphenous Nerve; Excision...	I
Infected Wounds; Antiseptic Dressings.....	4
Infected Wounds; Antiseptic Dressings and Prophylactic Injections of Tetanus Antitoxin.....	I

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Suppurating Inguinal Adenitis; Incision.....	1
Chronic Tenosynovitis; Immobilization, Bakings.....	1
Periostitis of Phalanges, with Suppuration; Incision, Necrotomy	2
Varicose Veins of Leg; Resection of Internal Saphen- ous with Multiple Ligations of Dilated Veins....	1
Foreign Body in Tibia; Exposure and Removal (Lane Plate 1. Silver Wire Loop 1).....	2
Fracture of Femur. Subtrochanteric; Extension in Abduction	1
Fracture of Tibia and Fibula (Old Ununited); Necrot- omy, Immobilization, Alcohol and Iodine Injec- tions	1
Fracture of Fibula; Plaster-of-Paris Case.....	1
Dislocation of Head of Humerus (Subcoracoid); Reduction	1
Fracture of Humerus at Neck; Incision, Reduction and Splints	1
Fracture of Shaft of Humerus (Lower Third); Re- duction and Splints.....	1
Fracture of Bones of Forearm; Reduction, Splints..	3
Fracture of Radius at Middle (Direct); Reduction, Splints	1
Fracture of Lower Extremity of Radius; Reduction, Splints	2
Old Fracture of Lower Extremity of Radius (Healed in Deformity); Exposure by Incision, Refracture, Reduction, Splints.....	1
Fracture of Metacarpus; Bandage.....	1
	<hr/>
	30
Total Number of Operations Performed.....	319



THE RADIOGRAPHIC DEPARTMENT.

As the diagnostic work of the clinic has progressed it was found quite essential that a radiographic department should be instituted, both that our personal work might be more accurately controlled and also that the examination of cases referred for diagnosis only might be more expeditiously carried on.

Proper and adequate accommodation therefore was found for the installation of a Wappler seven and one-half kilowatt machine, King model (Fig. 1). The Kelley-Koett plate changing table (Figs. 2 and 3) is used in conjunction with the tube stand made by the same firm, in order that stereoscopic radiograms may be obtained. With this apparatus any position of any part of the body may be radiographed with the greatest ease—the table and tube stand being universally adjustable.

The developing room is placed immediately adjacent to the examining room, which has proven of great convenience, especially in the reduction of fractures and securing their proper alignment, as the person developing the plates can inform the operator of the exact degree of progress without waiting for the ten extra minutes to elapse before the plate itself can be placed in the light box.

The taking of stereoscopic radiographs has been found of great value in the estimation of the relative position of the organs of the chest, kidney stones, ureteral calculi in relation to an ureteral catheter, fragments of fractured bones, dislocations, skulls, etc., and while extra care is entailed in their production, the results are very gratifying when obtained.

The interpretation of the prints which are sent to the patient's physician is made easy by accompanying sketches or accentuations prepared by the artist.

We believe much expense and certainly great inconvenience are obviated by this correlation of continuous examination.

FIG. 1.



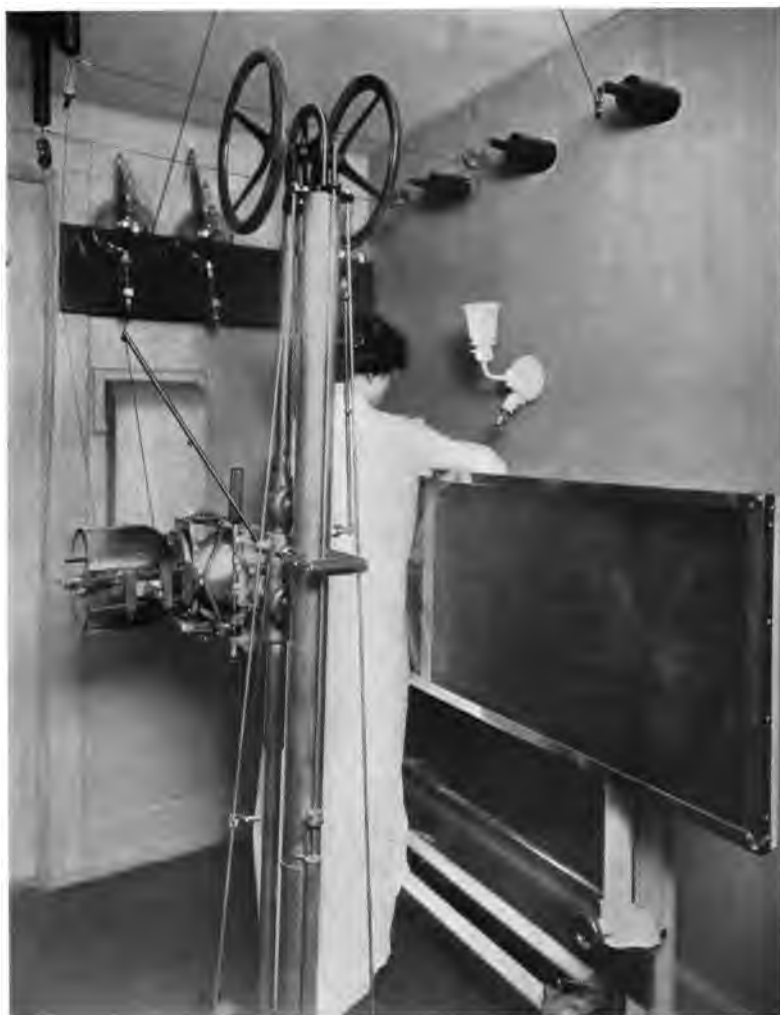
Wappler seven and one-half kilowatt machine. King model.

FIG. 2.



Kelley-Koett plate changing table and tube stand in position for prone radiography.

FIG. 3.



Kelley-Koett plate changing table and tube stand in vertical position for standing radiography.

FIG. 4.



FIG. 5.

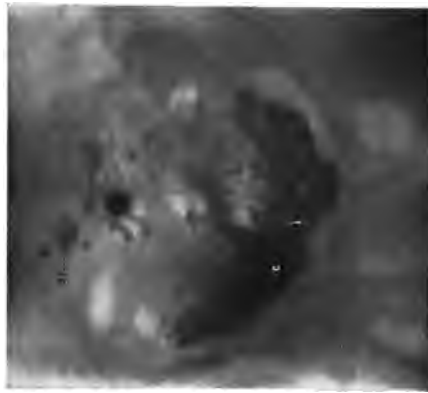
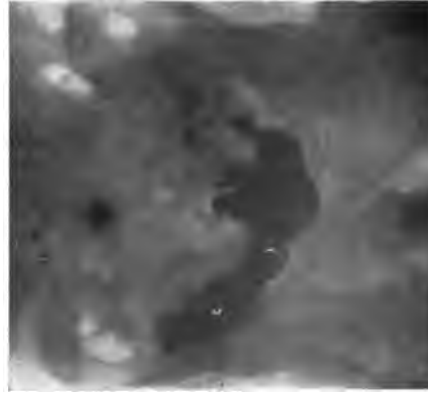


FIG. 6.



FIGS. 4, 5, 6, 7, 8 and 9.—Showing method of complete visualization of the gastro-intestinal tract. The chief pathological data derived from the study of this case are: the residue in stomach after six and eight hours (Figs. 4 and 5) and the residue in the pyloric cap (Figs. 4 and 5). The bismuth button in the crater of a perforated ulcer (Fig. 6). A caecum mobile (Figs. 5, 6 and 9). *st.*, stomach; *r.*, residue in stomach; *dc* and *pc*, duodenal or pyloric cap; *dp*, defect in pylorus; *dr*, duodenal residue; *si*, small intestine; *l.*, ileum; *c.*, caecum; *hf*, hepatic flexure; *lc*, transverse colon; *sf*, splenic flexure; *des. c.*, descending colon; *s*, sigmoid.

FIG. 7.



FIG. 8.

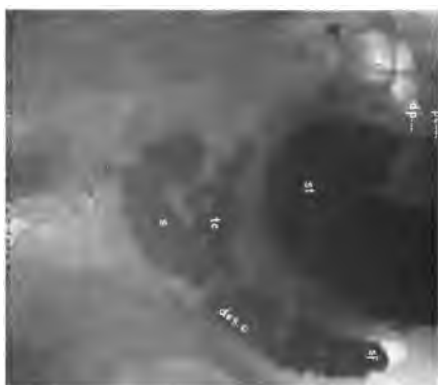
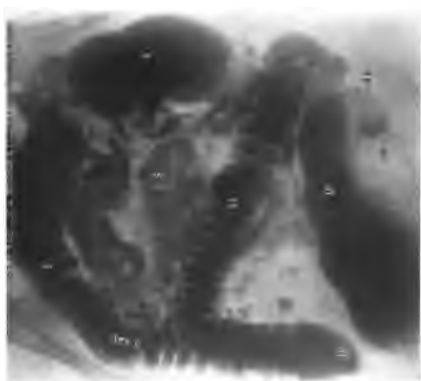


FIG. 9.



Whether lung, stomach, intestinal, gall-bladder, kidney or vesical data are required, they can be obtained immediately without making separate appointments or having to send the patient to another consultant in a distant part of the city.

The work accomplished during the past year naturally divides itself into that of the organs and tissues examined, as the general gastro-intestinal tract, stomach, duodenum, gall-bladder, kidney, ureter, bladder, lungs and bones.

In the following pages a description is attempted of the information which may be gained by such examinations. The plates illustrate in a limited degree some of the appearances found radiographically in diseased conditions of the various organs and tissues. The latest advance in technic, that of diagnosis of gall-stones and cholecystitis, will be considered more fully and more profusely illustrated.

X-RAY DEMONSTRATION OF LESIONS OF THE GASTRO-INTESTINAL TRACT.

The ingestion of bismuth meals together with the use of bismuth enemata administered at definite intervals, makes possible visualization of the various portions of the gastro-intestinal tract and the following of a known quantity of food impregnated with bismuth salts throughout its progress along the bowel. During the past two years the technic of this work has been perfected to a remarkable degree (Figs. 4, 5, 6, 7, 8 and 9). The work done has demonstrated the danger of basing a diagnosis on a single picture or a single series of pictures of an actively functioning organ, such as the stomach or intestine; of one whose form and size are continually changing due to muscular activity; and one whose position is markedly influenced by the posture of the patient and the content of the organ. It is the premature diagnosis made from an insufficient number of plates taken in a given case which has tended to destroy the confidence of some in the value of the radiograms obtained. One must make thorough, systematic, repeated serial radiographs, if it is desired to obtain a diagnosis of any value. We have learned, furthermore, that it is best

to take pictures of the patient under normal conditions of activity and habit. We no longer purge the patient, nor do we insist upon special diets preliminary to our examination.

SERIAL RADIOGRAPHY OF STOMACH AND DUODENUM.

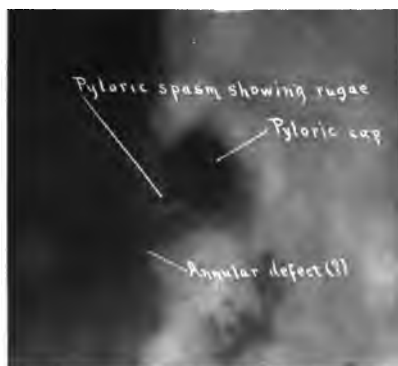
As has been stated above, it is necessary to make repeated serial studies of the stomach and duodenum at various stages of digestion in order to differentiate between various lesions which may be present. It is the constant repeated finding of a defect which is of diagnostic value. On individual plates the most bizarre deformations may be noted, but may be due merely to pressure against the spine or certain stages in the peristaltic cycle; pyloric spasm may lead one to infer a complete annular defect, such as is seen in cases of extensive cancerous involvement (Fig. 10), but another exposure taken a few minutes later shows a perfectly normal pylorus and pyloric antrum (Fig. 11). Fluoroscopic examination is in many cases of great value and certainly less expensive, but the demonstration of the smaller lesions, especially in the pyloric region, is practically impossible. It is unquestionable, however, that the greatest advantage to both examiner and patient is gained by using both methods in every case.

Deformities and filling defects of the pylorus are particularly easy to demonstrate, especially if the involvement is such as partially to obstruct the lumen (Figs. 12, 13, 14, 15, 16 and 17). Differentiation between cancerous and non-malignant stenoses may frequently be inferred most definitely owing to the character of the borders and overlying edges of the defect.

Cancer of the stomach, even in its earliest stages and with almost absolute certainty in its later stages (Fig. 18), may be diagnosed, frequently the inadvisability of operative procedure may be shown. More frequently, however, the indication for immediate removal can be definitely demonstrated.

The nature of extragastric pathologic processes may also sometimes be demonstrated, as plastic tubercular peritonitis (Figs. 19 and 20). The adhesions due to inflammatory process

FIG. 10.



Shows pylorus in stage of contraction with rugae in relief. Simulating defect in pyloric antrum.

FIG. 11.



Shows same stomach as Fig. 10, with pylorus relaxed.

FIG. 12.

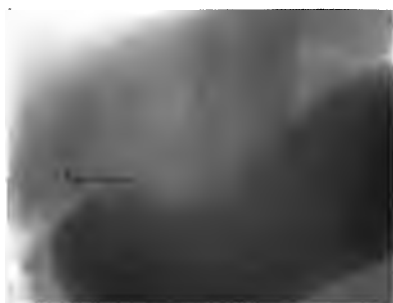


FIG. 13.



FIG. 14.

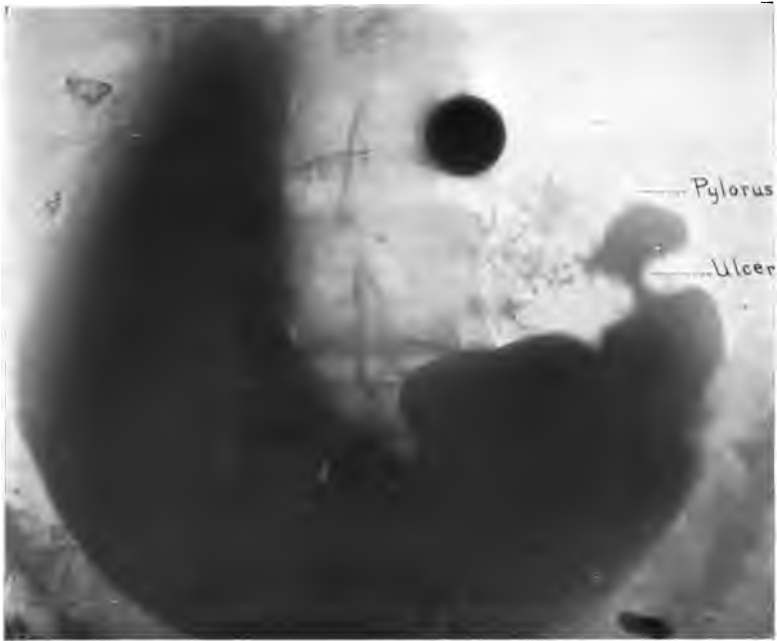


FIG. 15.



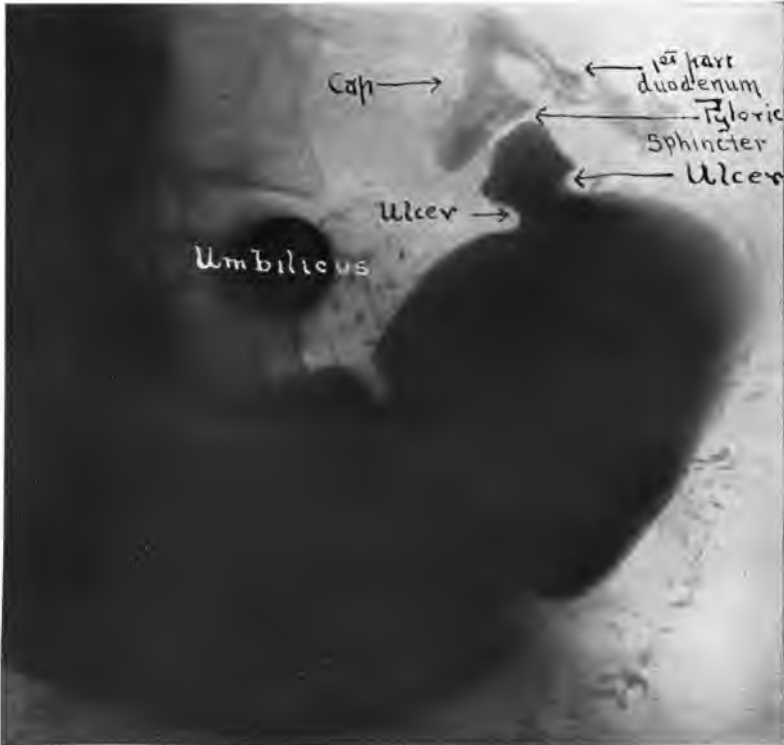
FIGS. 12, 13, 14 and 15.—Serial study of ulcer of pylorus obstructing lumen, causing dilatation of stomach.

FIG. 16.



Shows prepyloric ulcer markedly obstructing outlet causing dilatation of a stomach prolapsed to the third degree. The invasion of lumen by the ulcer might be mistaken for pylorus if serial exposures had not been made (compare Fig. 17). (Stomach reversed in photograph.)

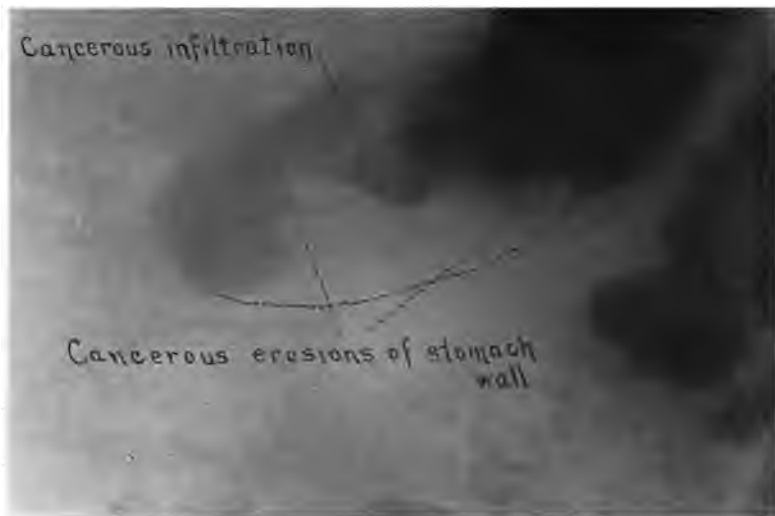
FIG. 17.



Shows deformity seen in Fig. 16 to be an ulcer, as the pyloric sphincter now shows distinctly with its superimposed cap. (Stomach reversed in photograph.)

FIGS. 19 and 20.—Show effect of plastic tubercular peritonitis on fundus of stomach, deformity due to extensive adhesions, presence of gall-stone and a definite shadow (a) in Fig. 20 of plastic tubercular infiltration of peritoneum. *pl. tb.*, plastic tuberculous; *tb. a.*, tubercular adhesions; *a.*, plastic tubercular peritoneum. (Stomach reversed in photographs.)

FIG 18.

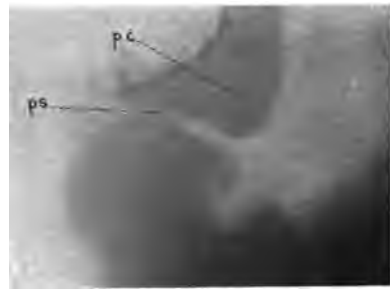


Shows advanced cancerous invasion of greater curvature of stomach and definite areas of cancerous infiltration in the stomach wall.

FIG. 21.



FIG. 22.



FIGS. 21 and 22.—Show result of adhesions from the gall-bladder to the first portion of the duodenum. *pc*, pyloric cap; *ps*, pyloric sphincter.

FIG. 23.



Stomach reversed in photograph.

FIG. 24.



FIG. 25.



FIG. 26.

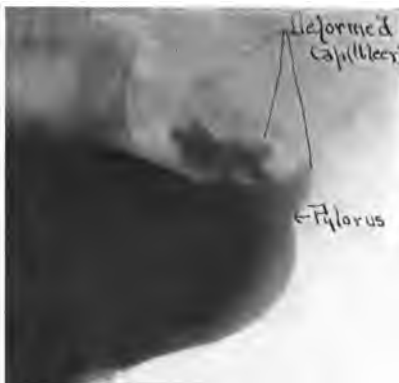
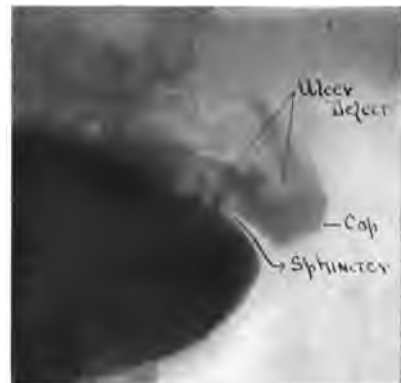


FIG. 27.



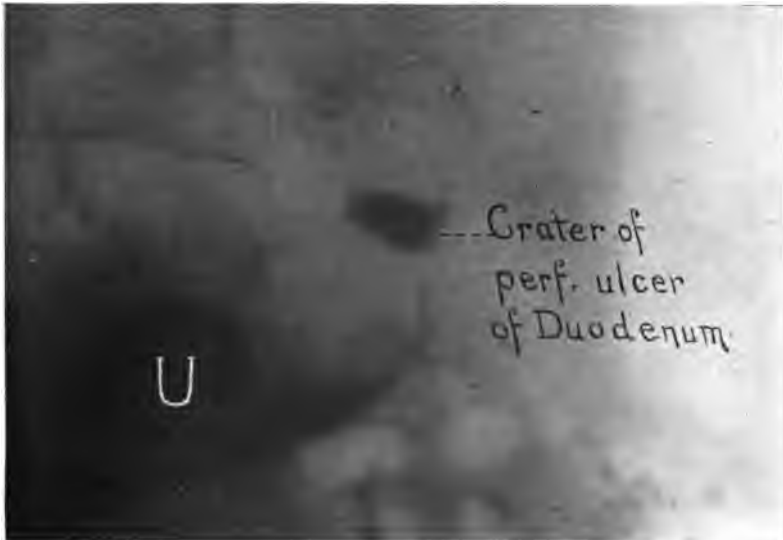
FIGS. 24, 25, 26 and 27.—Serial radiographic demonstration of permanent deformity occurring in pyloric cap as the result of extensive ulceration. (Stomach reversed in photographs.)

FIG. 28.

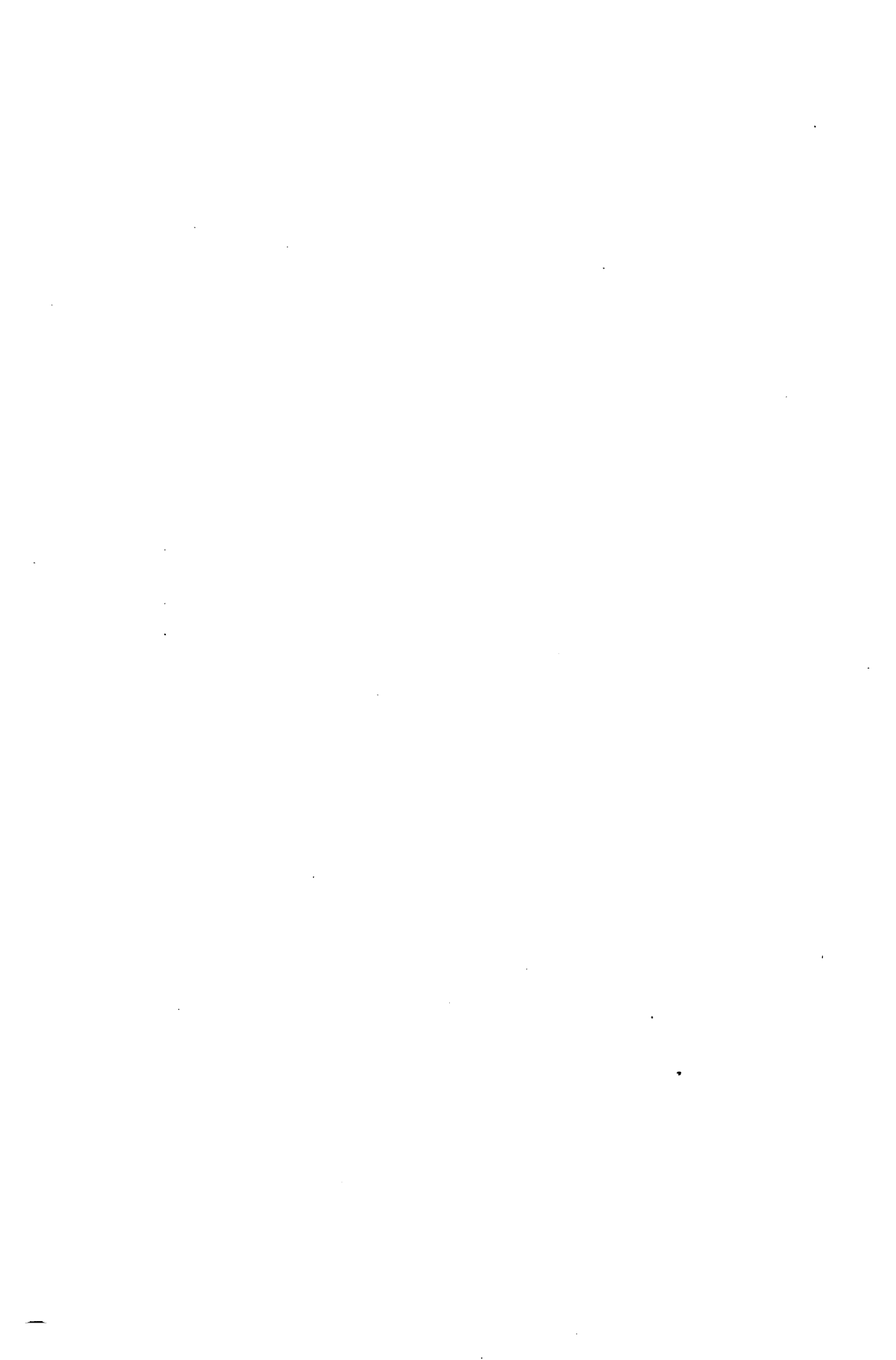


Demonstrates benefit derived from radiograph taken six hours after bismuth meal, showing residual bismuth button deposited in crater of pyloric ulcer (*b*) while remainder of meal has passed on to the cæcum and ascending colon (*ac*).

FIG. 29.



Shows bismuth deposit in crater of perforated duodenal ulcer.



about the gall-bladder are frequently obvious (Figs. 21 and 22).

The demonstration of duodenal ulcer is probably the most definite picture obtained by röntgenography, as the first portion of the normal duodenum presents a smooth surface and is shaped much like a cocked hat. This appearance can usually be shown on all normal duodeni (Fig. 23). Should any defect be demonstrated in its outline constantly, it indicates beyond doubt a definite anatomic change in its walls (Figs. 24, 25, 26 and 27). Differentiation between adhesions and ulcer is, as a rule, not difficult. The advantage to be gained by taking plates 6 and 10 hours after a bismuth meal has been taken is to be seen in Fig. 28, in which illustration one may see the button of bismuth which has been left deposited in the crater of an ulcer, while the remainder has passed on to the cæcum. Fig. 29 shows a deposit of bismuth remaining in the crater of a perforated ulcer of the duodenum after the pyloric cap has become empty.

RADIOGRAPHY IN THORACIC DIAGNOSIS.

While the value of radiography has long been appreciated in the diagnosis of tuberculosis of the lung, and in the more accurate demonstration of lesions of various kinds involving the thoracic œsophagus (ref. section on Diagnosis and Treatment of Diseases of the Esophagus), the importance of examining the thoracic cavity for evidences of malignant disease, both sarcomata and carcinomata, should not be overlooked, since both of these conditions give very characteristic shadows, which when properly interpreted may modify one's diagnosis and prognosis considerably.

The brief recitation of three cases occurring during the past year is of interest in this connection.

CASE I.—*Metastatic carcinoma of thoracic cavity.* Mrs. T. D. P., aged thirty-eight. Had right breast removed for carcinoma. At secondary operation left breast was removed, subsequent to which developed an obstinate bronchitis.

Radiographic examination showed extensive carcinomatous

involvement around the roots of both lungs, a circumscribed area of infiltration one inch in diameter opposite end of second rib, and an obliteration of the costo-diaphragmatic angle.

CASE II.—*Sarcoma of left thoracic cavity.* H. M., aged twenty-three. Six months before examination complained of dyspnoea on exertion, with precordial discomfort and pain in left shoulder. This condition lasted ten days, after which time he was free from symptoms for two months, when he suffered from a similar attack for a few days, with following free interval for five months, when there developed a persistent progressive retrosternal distress, with dyspnoea, and an intractable dry, distressing, continuous cough, with occasional blood-streaked sputa.

Radiographic Examination.—Shows heart displaced to the right three inches and pushed forward firmly against the anterior chest wall; the upper part of the left thoracic cavity filled with a solid mass extending downward and obliquely to the right, behind the heart, about the size of fetal head, impinging on the left crus of the diaphragm, markedly and irregularly deforming it (Fig. 30).

The disease progressed steadily, with other unmistakable signs of intrathoracic tumor, and finally terminated in death about four months after the taking of this photograph (see page 33).

CASE III.—*Encysted filariæ.* G. H. M., aged fifty-seven, male, employed for several years on Isthmus of Panama, presented himself for diagnosis relative to the cause of great swelling of left leg and left arm. The condition suggested blocking of the thoracic duct. *Filaria sanguinis hominis* were isolated from smears from blood obtained at 2 A.M.

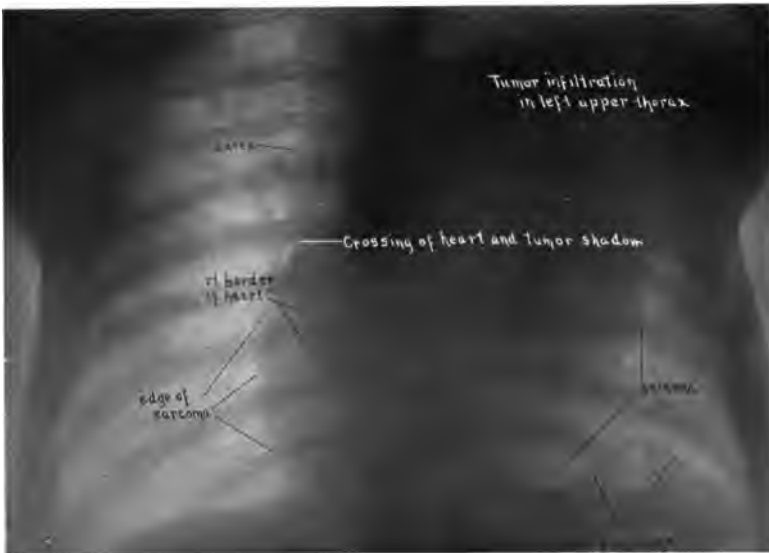
Radiographic examination shows great number of small shot-like nodules scattered throughout both chest cavities and an irregular mottling in the region of the main lymphatic ducts at the base of the neck (Fig. 31).

Diagnosis.—Possibly encysted filariæ. The shadows do not represent tuberculosis.

THE X-RAY IN UROLOGY.

A properly taken radiograph has become an absolute necessity for the proper conduct of any department of urology. In addition to its value in rendering more accurate a diagnosis, it may be a very great aid to the operator in determining the

FIG. 30.



Intrathoracic (mediastinal) sarcoma.

FIG. 31.



Intrathoracic lymph-nodes containing encysted filariae.

FIG. 32.



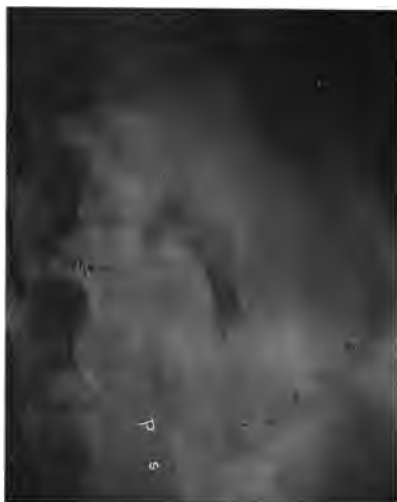
Radiogram showing small, hard stone occupying pelvic outlet of the right kidney. Note the clearness of the psoas muscle.

FIG. 33.



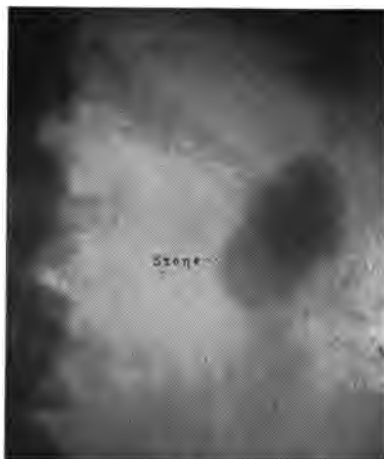
Position and size of stone obstructing left ureter in same case as Fig. 1. Denseness in renal region increased by congestion of kidney.

FIG. 34.



Radiogram showing a large branching phosphatic stone in the kidney in a case of persistent pyuria without any renal symptoms.

FIG. 35.



Radiogram showing giant stone obstructing the pelvic outlet of the kidney with production of pyelonephrosis. The original plate shows clearly the greatly increased size of kidney.

FIG. 36.



Radiogram showing stone in the dilated calyx of a kidney.

FIG. 38.



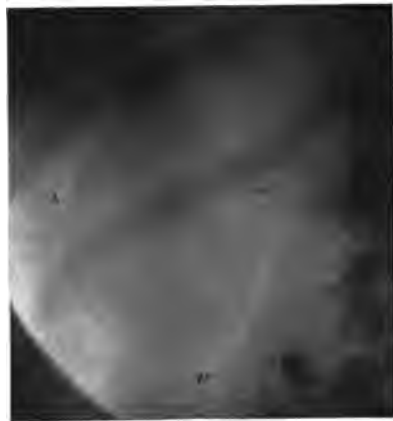
Radiogram showing two small calculi in kidney, which do not call for operation, but which will almost surely be passed under appropriate treatment.

FIG. 37.



Radiogram obtained in a case of tuberculosis of the kidney, showing catheter entering the pelvis of kidney and accumulations of caseous material impregnated with phosphatic salts, giving shadows resembling calculi.

FIG. 39.



Radiogram showing stone descending right ureter with an enlarged congested kidney which shows plainly in the original plate. This unquestionably calls for operation. *s*, stone; *k*, kidney; *p*, kidney pelvis; *ps*, psoas muscle.

FIG. 40.



Radiogram obtained in case of vesical calculus. From the picture it was decided that the stone could be crushed and this was successfully done by litholapaxy.

FIG. 41.



Radiogram of large vesical calculi which were removed by suprapubic cystotomy.

FIG. 42.



Radiogram showing calculus arrested in the vesical portion of the ureter. This stone was removed by making an opening in the ureter with the high frequency spark used through the cystoscope.

character of operation to be undertaken in a given case. By combining X-ray and cystoscopic examinations a deductive diagnosis in complicated cases is more readily arrived at. For example, Fig. 32 shows a hard stone occupying the pelvic outlet of the right kidney. In the original plate the outline of the kidney is distinctly shown. The subject of the picture had suffered for 20 years from kidney and bladder symptoms, but the presence of a stone was not suspected by her physician until an X-ray picture was taken. In addition to this stone in the right kidney, the left ureter was found to be blocked by a large stone (Fig. 33). The ureteral catheter could not pass the obstruction in the left ureter. Functional test of the right kidney showed it to be little impaired by the presence of the stone in the pelvis. The left kidney showed marked derangement of the functional capacity. The result of the examinations, therefore, at this clinic, showed that the patient's health was greatly impaired; that the pelvis of the right kidney contained a stone; that there were no other stones in the right kidney; that the size and function of the kidney were practically normal. The left ureter was known to be blocked by a large stone which could not be passed into the bladder. As a result of this the left kidney function was greatly impaired and a condition of hydronephrosis of the left kidney was present. From the combination of the radiographs and cystoscopic findings, we felt that the indication was to remove the stone from the pelvis of the right kidney by means of a pyelolithotomy, because if the operation were done on the left kidney and ureter first, and it were found necessary to remove the left kidney, the operation on the right kidney would be extra-hazardous in the absence of the left kidney. Whereas, if an accident took place during the operation on the right kidney and the left kidney was still functioning, the chances of recovery would be greater. Therefore, it was decided to operate upon the right kidney first and this procedure was followed with very satisfactory results.

Again, in cases of pus or blood in the urine, we repeatedly meet with cases in which the symptoms, both objective and

subjective, are so obscure that nothing but a definite picture can decide the case. We have records of numerous cases the main symptoms of which have been irritability of the bladder, and pus coming from one kidney without the findings of tubercular bacilli in the urine. In one such the X-ray revealed the presence of a large branching stone in the kidney (Fig. 34). In a second case there was shown the presence of a large obstructing stone in the pelvis of the kidney with pyelonephrosis (Fig. 35).

Fig. 36 shows a stone in the dilated calyx of the kidney. Numerous other cases could be cited, but these will suffice as illustrations.

In cases of tuberculosis of the kidney, we have obtained some remarkable pictures, one of the most striking of which is seen in Fig. 37. This shows a radiographic catheter entering the pelvis of the kidney and an accumulation of phosphatic impregnated caseous material in the kidney, giving shadows resembling those of stone.

Experience in reading the radiograms makes it possible oftentimes to differentiate those cases which demand operation and those cases in which there are fairly good expectations of delivering the stone from the kidney through the bladder, by non-operative means. This is determined to a certain extent by the size and position of the stone and the amount of kidney destruction and functional derangement which is present.

Fig. 38 shows two small shadow-like calculi in the kidney which do not call for operation.

Fig. 39 shows a stone descending the right ureter with an enlarged, congested kidney showing plainly on the original plate, which unquestionably calls for operation as soon as possible.

By repeated X-ray examination the progress of a renal calculus may be determined and, if necessary, the best time for operation may be elected.

In the bladder, stone may often be determined by a radiogram without subjecting the patient to cystoscopy and the

method of operation elected just as intelligently (see Figs. 40 and 41).

Fig. 42 shows a stone engaged in the wall of bladder, blocking the opening of the left ureter, for which operation was necessary.

During the year a more extended report on this work, together with illustrations, will be published. The present report, however, calls attention to the importance of this department of diagnosis in urology.

Pyelography as an aid to diagnosis will be discussed later.

FRACTURES.

ELEVEN fractured bones have been under treatment, viz.: fracture of metacarpal bone 1; fracture of lower extremity of the radius 5; fracture of shaft of the radius 1; fracture of the radius and ulna near their middle 2; fracture of the fibula 1; fracture of the femur, subtrochanteric 1.

Of these the following are deserving of special remark at the present time.

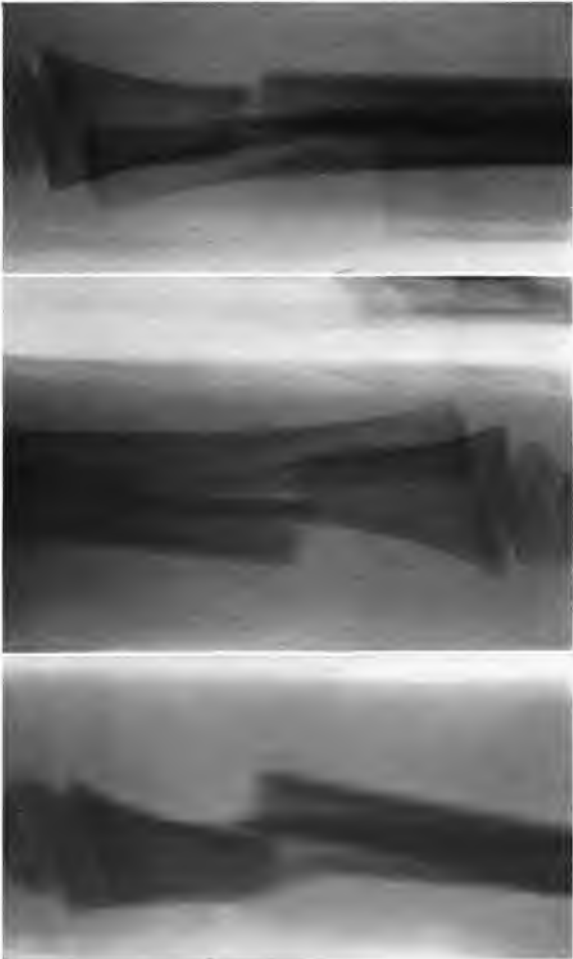
CASE I.—*Fracture of right radius and ulna at the junction of their lower and middle thirds; manipulations to overcome deformity controlled by series of radiographic plates (Fig. 43, A, B, and C). Good apposition secured by straight palmar and dorsal splints. This case is mentioned more particularly for the reason that after what appeared to have been satisfactory reduction had been secured by the usual manipulation, a skiagraph taken on the spot showed the position of the fragments still to be far from satisfactory. Guided by this demonstration, further manipulations were at once resorted to, resulting in a greatly improved and fully satisfactory reposition of the fragments.*

CASE II.—In a second case, as the result of a direct blow of much force, the right radius was fractured at its middle with marked displacement inwards of the upper end of the lower fragment, as shown in Fig. 44, A. While the patient was still on the X-ray table the surgeon, guided by the plate showing the displacement, was able at once by manipulation to obtain perfect reposition and interlocking of the serrated broken ends, as shown in Fig. 44, B.

CASE III.—*Subtrochanteric fracture of the femur; marked deformity; satisfactory reduction by position and extension; consolidation without shortening.*

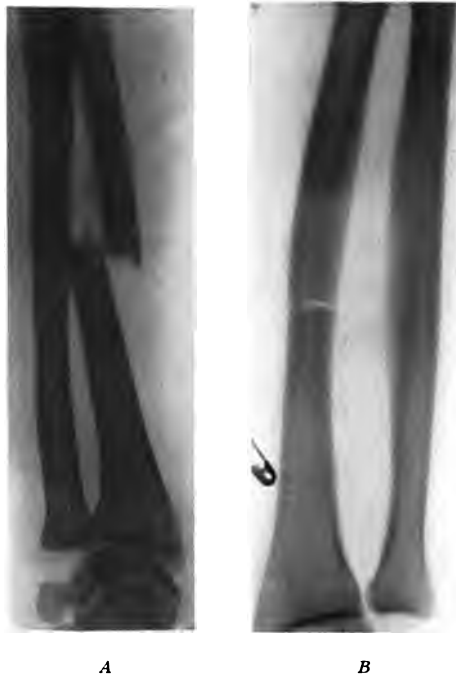
Two weeks previous to admission this patient, a lady forty-eight years of age, had sustained this injury while on vacation in the country. When brought to the city and admitted to hospital, the condition was as shown in Fig. 45, in which the outlines of the somewhat indistinct skiagraph have been strengthened by the artist to facilitate reproduction. The upper fragment was flexed

FIG. 43.



A, condition on admission; *B*, condition shown by skiagraph after first manipulation and apparent satisfactory reduction; *C*, final improved condition resulting from renewal of efforts at reduction.

FIG. 44.



Fracture of radius. *A*, relation of broken ends when admitted; *B*, ideal reposition of fragments secured by manipulation. X-ray demonstration.

FIG. 45.



Subtrochanteric fracture of femur, showing amount of displacement of fragments and deformity when admitted.

FIG. 46.



Showing condition after full consolidation; all shortening overcome; lateral reposition imperfect but compensated by attendant callus formation.

FIG. 47.



J. C. Showing condition of tibia containing Lane plate after two years and nine months (January 30, 1914). See Case No. 145.

and abducted and the lower fragment was drawn upwards producing a shortening of one and a quarter inches. The patient was somewhat stout in habit and of highly nervous temperament. The difficulties to be overcome in securing satisfactory reposition of the fragments were appreciated. We were familiar with the fact that in this class of fractures position and traction are usually so inefficient in overcoming displacement that such a fracture is recognized as one in which exposure and plating are especially indicated. We hesitated therefore to rely on position and traction in this case, notwithstanding that in no case of this kind previously under our care had we failed to get a satisfactory result either as regards function, deformity, or length. But in this particular case, taking into account the length of time since the injury had been sustained and the peculiar physical and temperamental status of the patient, we earnestly advised that the fracture should be exposed and coaptation secured by plating. The patient herself, however, would not accept this proposition, but insisted that first a non-operative treatment should be tried. This was therefore instituted. A slight flexion was obtained by keeping the leg on a sliding Volkmann's apparatus, which also reduced to a minimum the friction resistance to the full effect of the extension traction. Counterextension was provided not only by elevating the foot of the bed, but also by the use of a suitable perineal band secured to the head-post of the bedstead. A pelvic band held the pelvis to the side of the bed corresponding to the sound limb, so that by placing the traction pulley at the foot of the bedstead, close to the opposite post, a good angle of abduction was secured. The perineal counterextension band, the pelvic lateral band, the sliding leg support and abducting extension adhesive strips, kept taut by the weight at their end, all formed a very excellent confining harness that still was not intolerable, and, as the event proved, was well borne by an unusually restless and intolerant individual. This traction weight was rapidly increased up to twenty-five pounds. This was well borne and within a few days the length of the injured limb was brought to the same measurement as that of the sound one. Consolidation proceeded in normal rapidity and at the end of ten weeks the patient walked out of the hospital with the aid of crutches. The condition at the time of discharge is shown in Fig. 46.

Examination made four months later confirmed the facts that

the length of the two limbs was equal and that no deformity was exhibited by the injured thigh.

We are reporting this case somewhat fully, not with a view of in any way reflecting upon the value or propriety of subjecting such injuries frequently to exposure by incision and to plating, but as an example of the possibility of securing excellent results by more conservative methods whenever for good reasons prudence dictates the avoidance of the special hazards which must always attend the more radical and perhaps more efficient operative methods.

CASE IV.—*Removal of Lane plate from tibia three years after its application for fracture.*

In the Year-Book, vol. ii, 1911-1912, pp. 15-17 is reported a case of fracture of tibia and fibula, attended with marked displacement of the fragments, which had proven refractory to ordinary methods of management and at the end of three weeks was brought to the hospital presenting still free mobility at the site of the fracture with deformity and shortening. In this case the fracture was exposed by incision and the fragments secured in apposition by a Lane plate. An aseptic healing followed, with firm union without shortening or deformity. One year later, when the first report was made, it was stated that the plate was still *in situ* and was the source of no inconvenience and that the plated leg was strong, straight and symmetrical. Nearly two years later, being two years and nine months after its insertion, the man returned with the request that the plate be removed. It had as yet occasioned him no inconvenience, but he was apprehensive that at some future time it might become a source of trouble. As the location of the plate was superficial and the removal involved a minimum of risk, his request was complied with. The condition at that date is shown in the skiagraph then taken, Fig. 47. When the plate was exposed it was more firmly held in place than when first applied, for an osteophytic development of new bone had formed along a considerable portion of its edges which had curled over these edges so as to form a bony encasement that firmly locked the plate in its seat. In addition to this, however, the screws had not loosened and the whole apparatus was being borne without irritation. The new formed bony case had to be chiselled away before the plate could be removed.

BENIGNANT TUMORS.

THE distinction between a benignant and a malignant tumor is a practical one, and depends upon the elements of capacity for metastases and indefinite growth. A uterine myoma or an ovarian cystoma may cause death by pressure effects or by degeneration, necrosis and exhaustion, but it is none the less essentially a benignant growth, for it is self contained and does not return after removal. Tuberculous lymph-nodes may be considered border-line formations, essentially inflammatory products, but dependent upon the presence of a micro-organism as the primary irritant. Although these organisms may be transmitted through the blood stream or the lymphatics to other nodes or to other organs and parts and occasion secondary formations, such secondary formations are not to be considered as metastases, but as new infections. Retention cysts due to inflammatory closure of outlet ducts are examples of pure benign growths of inflammatory origin. Angiomatous masses are errors of development, or, as in the case of hemorrhoids or varicosities of the legs, may be due to the combined influences of gravity, pressure and irritation.

Lipomata, papillomata, adenomata, myomata and fibromata, examples of real tissue proliferation, form a distinct group, which have the important peculiarity of proneness to ultimate malignant transformation. In view of the comparative safety which attends the operative removal of such growths as a rule, we have no hesitation in advising their removal in nearly all cases.

As first in the order of importance among benign growths should be considered *cystadenoma and fibroma of the breast*. In this class during the present period seven patients have come to operation. With one exception the age of these patients was between forty and fifty years. One adenocystic woman was thirty-six years of age. One case, age forty-two,

was a pure thin-walled cyst. Three were thick-walled cysts surrounded by a zone of proliferating gland tissue,—adenocysts. Three were essentially fibromata. In two of the cases of adenocyst the entire breast was removed. In the remaining five cases partial resections of the breast were resorted to, removing only that part of the breast which contained the tumor.

The method adopted by us for partial breast resection is to make the primary incision around such an extent of the periphery of the breast as will expose the outer edge of the tumor-bearing part of the gland, which is then raised up from the pectoral muscle underneath until by palpation it is determined that all that portion of the breast containing the tumor has been raised and exposed. This tumor-bearing segment is then cut out, the cut breast surfaces are then brought together by suitable buried chromic gut sutures and the gland reconstituted. Suture of the skin incision closes the operation. This method, which is not at all original with us, seems to give abundant access to the mass to be removed, entails the least immediate disfigurement and secures the best ultimate cosmetic result.

MYOMATA OF THE UTERUS.—Eight cases of uterine fibroids came to operation. In all the tumors were exposed by abdominal incision. In four of the cases the tumors were either so pedunculated or so isolated in the uterine wall that it was possible to remove or enucleate them without the removal of the uterus. One of these cases is worthy of relation in detail, viz.:

CASE.—Hospital No. 810. Age, forty-five. For fifteen years this lady had been annoyed by vesical irritability which compelled her to empty her bladder at times as often as every half hour day and night. Some years before operation it had been demonstrated that there was a fibroid springing from the anterior wall of the uterus, pressing upon the trigone of the bladder. Operation was long refused by her until the evident increasing size of the tumor and aggravation of her bladder condition became sufficient to overcome her fears of surgery. When finally the abdomen was opened, a myoma the size of an orange was easily enucleated from its site in the anterior wall of the uterus. The

reconstructed uterus was anchored to the anterior abdominal wall. Her operative recovery was pleasant and without complication and the relief of her bladder disturbance was immediate and complete.

Troublesome bladder irritability due to the pressure of a pelvic uterine myoma is illustrated in another of this series of cases:

CASE.—Hospital No. 646. Age, fifty years. For more than a year had suffered from pelvic discomfort, and especially from vesical tenesmus when much upon her feet. Upon exploration of the pelvis there was felt confined in its cavity a firm but movable mass the size of a large apple. When the abdomen was opened this proved to be a myoma attached to the fundus of the uterus by a comparatively thin, long pedicle which allowed the tumor to prolapse into the cul-de-sac behind the uterus. The pedicle was divided within the substance of the uterine wall, and the comparatively small uterine wound was sutured. The patient recovered from the operation and was cured of her bladder trouble.

HYSTERECTOMY FOR MYOMA.—In four instances (Hospital Nos. 577, 660, 760 and 796) an intra-abdominal supravaginal hysterectomy for myomata has been necessary. In each instance an uneventful recovery was secured. The following two cases are worthy of special mention.

CASE.—*Myoma of fundus; elongated body simulating pedicle.* Hospital No. 577. Age, forty-three years. Patient after an automobile ride of one hundred and fifty miles was seized with severe and continuous abdominal pain which called for examination of the abdomen by her physician, in the course of which the presence of a right-sided growth extending up to the lower surface of the liver was detected. When the abdomen was opened a moderate quantity of free blood in the peritoneal cavity was found smearing the surface of the intestines and a congested tumor the size of a child's head appeared in the region described. When this tumor was dislodged and brought up through the abdominal wound, it appeared to be continuous with

the body of the uterus by a stout, thick pedicle, with which on either side the broad and round ligaments were blended. When these had been separated and the pedicle had been cut through, it was apparent that the section had been made through the middle of the elongated body of the uterus, the fundus of which had been the seat of the tumor. The cut surface was sutured. The ovaries were preserved. An uninterrupted convalescence followed.

CASE.—*Intraligamentous development.* Hospital No. 796. Age, thirty-two. Digestive disturbances, vesical irritability, nervous excitability, right inguinal pain. A solid movable growth, on right side and middle of lower abdomen, extending into the pelvis and reaching the level of the umbilicus. Abdominal incision exposed a multinodular mass occupying the region described, the lower part of which was impacted in the pelvis. Efforts to dislodge it were ineffectual by reason of strong attachments to the right wall of the pelvis, and examination revealed that here the tumor had developed into the right broad ligament between the two leaflets of which it was embraced. Step by step it was enucleated until finally the entire mass was freely turned out. The greater part of the posterior surface of the uterus was adherent to the growth but the nutrient pedicle was comparatively small. A supravaginal section took away the body of the uterus with the tumor. The bed in the broad ligament from which the tumor had been enucleated was obliterated by a series of gut sutures. An apoplectic right tube and ovary were removed, but the left ovary and tube were preserved intact. An uncomplicated recovery followed.

OVARIAN CYSTOMA.—Two cases of ovarian cystoma, with unusual course, are to be recorded:

CASE I.—*Ovarian cystoma; twisted pedicle; necrotic wall; adhesion to fundus of uterus.* Hospital No. 487. Age, thirty-nine. For six weeks confined to bed by hypogastric tenderness and pain referred to right iliac region. Tender tumor palpable *per vaginam* in site of right broad ligament. Median suprapubic incision exposed a tense thin-walled cyst lying between the right wall of the pelvis and the uterus, to both of which it was united by friable adhesions. When these adhesions had been broken down and the cyst was liberated it was found to have developed

from the *left* ovary, its pedicle was twisted and spots upon its wall were threatening necrosis. This cyst contained a pint of grumous chocolate-colored material. The removal of the cyst was followed by an uncomplicated recovery.

CASE II.—*Intraligamentary ovarian cyst; enucleation; dead spaces obliterated by suturing.* Hospital No. 567. Age, fifty. Notwithstanding age of patient irregular mēnstruation persists. Examination demonstrated presence of a large globular movable mass in abdominal cavity. Median incision exposed a tense cyst. After removal of liquid contents through a trocar, its full delivery was still prevented. Exploration showed that the cyst had sprung from the right ovary and had developed in the right broad ligament by the layers of which it was embraced from the uterus to the brim of the pelvis. Its enucleation was effected without accident, producing an extensive raw-surfaced cavity. By the careful placing of multiple sutures this cavity was obliterated and the large intraperitoneal wound was closed. Uncomplicated recovery.

The remaining cases included in this class of benignant growths were made up of papillomata, neuromata, keloids, retention cysts, hydroceles, hemorrhoids, hypertrophied tonsils and adenoids, tuberculosis of epididymis, tuberculosis of cervical lymph-nodes, goitres—thirty-two in all. They were all removed.

PROSTATIC HYPERTROPHY properly belongs in this group, although the accident of its relation to the urinary exit adds to it a special feature that brings it into importance. In the period now under report the removal of the fibro-adenomatous tumor was resorted to in thirty successive cases without a death. These have been discussed at length in Appendix G.

ferred to this clinic. They form the basis of the more elaborate study in Appendix F.

Ten cases of *breast cancer* have been operated upon. This subject has been fully considered in previous Year-Books.

Sarcoma was met with as follows: Sarcoma of the head of femur 1; of condyloid extremity of the humerus 1; of vertebra 1; of lymph-nodes of neck 1; of testicle 1; of mediastinum 1—six in all.

Of these cases, two are deserving of more detailed mention:

CASE I.—*Spindle-celled sarcoma of periosteum of condyloid end of humerus; excision; recurrence in muscle, second excision followed by radium exposure. No recurrence after lapse of one year.*

The patient was a young married woman, twenty-eight years of age. For a year she had been conscious of the presence of a circumscribed swelling on the posterior aspect of the external condyle of the left humerus, but for two months it had been noticeably growing in size. When she presented herself at the hospital there was visible a moderate-sized, elongated, firm tumor (Figs. 48 and 49) attached to the external condyloid ridge of the humerus. Radiograph showed the periosteum reflected over the tumor and forming its external capsule. The overlying skin was not involved. The diagnosis of sarcoma was practically positive. It seemed unthinkable to submit this woman to the mutilation of an amputation without a previous less radical effort at relief. The following procedure was therefore resorted to: A skin flap was raised which exposed fully the muscle covered tumor; the incision was deepened so as to circumscribe the growth at a wide distance from its base, exposing the anterior and outer surface of the humerus from the condyle upward; the posterior portion of the joint was opened by the side of the olecranon; with a chisel the compact tissue of the bony cylinder was chiselled through along a line that circumscribed the tumor-bearing portion of it. The shell of bone thus loosened was then lifted off, bringing the tumor with it. Primary union without any limitation of the elbow-joint movement followed. The condition of the bone after healing is shown in Fig. 50. The pathologist's report as to the character of the tumor thus removed

FIG. 48.



Sarcoma of periosteum covering external condyle of humerus. (Hospital No. 510.)

FIG. 49.



Sarcoma of periosteum of external condyloid ridge of humerus.

FIG. 50.



Defect left
in condyle
by removal
of tumor

Shadow of
tumor and
affected por-
tion of the
condyloid
ridge

Skiagraph showing condition of humerus one year after second operation for sarcoma.

was *spindle-cell sarcoma*. During the six weeks immediately following this operation a thorough course of the Coley serum was carried out.

For six months the patient remained free from any appreciable renewal of tumor formation. At the end of this time there was detected an indistinctly defined induration which had developed in the supinator muscular mass inserted along the site of the renewed ridge.

The new growth seemed limited to the muscular stump formed in the primary operation and was considered as a local implantation occurring in the course of that operation.

Second Operation.—Again the affected area was exposed by raising an appropriate skin flap. The deeper incisions were carried through tissue widely distant from the tumor mass. The whole block of tissue, including the subjacent periosteum was removed. Neither the periosteum nor underlying bone seemed involved. The wound was closed except for a cigarette drain at its lower angle. On the third day thereafter this drain was removed and a tube containing radium of 200,000 radio-activity was thrust down to the bottom of the drain sinus and left *in situ* for twenty-four hours. After its removal primary healing of the wound proceeded without complication. Again a six weeks' course of the Coley serum was carried out.

Fourteen months later this patient returned for examination in response to a request that she do so. The local conditions were apparently still without evidence of recurrence. The skiagraph forming Fig. 50 was then made. The general health of the lady was excellent.

CASE II.—*Sarcoma of the Mediastinum.*—This case is reported from its diagnostic interest (see also page 18, and Fig. 30). It was under our observation for a period of three weeks while diagnostic tests were being made. The unfavorable diagnosis which was finally arrived at with much positiveness caused the patient to put himself under the care of others who were willing to suggest a more hopeful prognosis. The final event, however, confirmed the diagnosis of sarcoma. A rapid and enormous tumor development ultimately filled the left side of the thorax and involved the structures at the base of the neck, producing

marked obstructive symptoms, both circulatory and respiratory, and death took place in less than three months after he passed out from under our care.

The patient in question was a young man twenty-three years of age, finely developed, of strong, large frame and athletic habits. The first suggestion of the disease was the development of a sense of shortness of breath after exertion accompanied with precordial discomfort and pain referred to the left shoulder and outer side of the left arm. These symptoms were at first intermittent, but after two or three months became continuous and more accentuated. There was no fever, no chills and no cough in the earlier history,—simply shortness of breath upon exertion, the respirations being normal when the patient was quiet. Gradually, however, there developed a bronchial wheeze with frequent attacks of pain in the shoulder and arm. Then there developed a persistent dry cough with occasionally the expectoration of a small amount of blood-streaked mucus. At the time of his entry into the hospital his temperature was normal, running along the 98 line, and continued so excepting when influenced by serum injections. His respirations when at rest were normal, being about twenty per minute, and his pulse was about 80. Hæmoglobin test was 85 per cent. Red blood-corpuscles 3,930,000; white blood-corpuscles 8000; polymorphonuclears 72 per cent.; eosinophiles 1 per cent.; basophiles 9 per cent.; lymphocytes 26 per cent.; myelocytes 2 per cent., the whole being a picture of a moderate secondary anæmia. Repeated examinations of the sputum always negative as to tubercular bacilli. The Moro tuberculin test was negative. Examination of the thorax showed heart displaced to the right three inches. Heart sounds accentuated. Right chest normal. Left chest, upper two-thirds solidified. Repeated introductions of a trocar into the left chest by different examiners at different times brought only blood. Radiograph (Fig. 30) showed an intrathoracic mass filling the upper middle portion of the left thorax behind the heart, the heart shadow being perfectly definite and continuous with the aorta. A tumor shadow formed a very definite angulation with the heart shadow, behind which it could be followed. The superior surface of the diaphragm presented an irregular outline, indicating the effect of the pressure of a tumor upon it,

and showing definitely that this tumor was solid, not fluid. The shadow was that of a definitely circumscribed mass springing obviously from a massive pedicle.

The conditions as described were not considered those of fluid effusion nor of tuberculosis, and there was no hesitancy on our part of arriving at a positive diagnosis of sarcoma of the mediastinum, probably having its origin in the mediastinal lymph-nodes.

Apropos to this case we may call attention to a paper by Dr. MacBean Ross¹ in which he gives a study of sixty complete cases of mediastinal growths observed at the Brompton Hospital of London, for diseases of the chest. Among the more important of his conclusions were that malignant disease of the mediastinum is not so rare as is generally supposed, there having been eighty cases of mediastinal new growths found among 20,745 patients admitted to the Brompton Hospital between 1900 and 1913. The anterior mediastinum is the common site of origin. Sarcoma is a common form of malignant disease of the mediastinum and usually takes the form of lymphosarcoma. If pyrexia is present it is due to some complication supervening upon or caused by the original condition. The persistent absence of tubercular bacilli in the sputum in a case otherwise suggesting pulmonary tuberculosis is very significant. Hæmoptysis, which is moderately common, is rarely severe. The disease is most common in early middle life, but may occur at any age.

After the diagnosis had been made in this case treatment with Coley's serum was instituted and was persevered in for about two weeks, when it was dropped by the patient owing to his incredulity as to the correctness of the diagnosis and the necessity of the treatment, which incredulity, natural to the patient, was strengthened by the opinions of other physicians consulted.

¹ Edinburg Medical Journal, vol. 13, No. 6, p. 444.

UNCLASSIFIED CLINICAL REPORTS.

SOLITARY CYST OF LIVER: ECTOPIC GESTATION: OBSTRUCTION OF BOWELS FROM
INTERNAL HERNIA: CHRONIC INGUINAL SINUS OF APPENDICAL ORIGIN:
BICHLORIDE OF MERCURY POISONING.

Solitary Cyst of Liver.—Hospital No. 751. Patient was a man seventy years of age, whose general health had been fair until within the preceding two years, after which time there had taken place a noticeable decline in his general strength, with a loss of weight of twenty pounds. During the period of his age between forty-five and fifty years he had had repeated attacks of left renal colic, but for the last twenty years had been free from all renal symptoms. At the present time he had no symptoms referable to the urinary system, but had suffered much pain referred to the lumbar regions, radiating down to the thighs, most marked on the right side. Recently he had become conscious of a cocoanut-sized tumor in the upper right quadrant of the abdomen. This was globular in shape, painless, freely movable, more particularly toward the middle line and to the left. He was unable to lie upon his right side because of an uncomfortable sense of deep traction then experienced.

The tumor was exposed by an incision through the upper right rectus muscle. The thin gastrocolic omentum was spread out over it. The stomach was identified lying above and to the left; the transverse colon below. The tumor projected into the operative field, filling it. It was loosely adherent over its entire surface. It was easily enucleated down to its base, which was broad. Through a trocar introduced into it about two quarts of limpid straw-colored fluid escaped. The flaccid cyst wall was then drawn out and found to have a broad, deep base, which was embedded in the under surface of the right lobe of the liver. The cyst was not the gall-bladder. Efforts were made to dissect the cyst wall from the liver, but the technical difficulties soon became so great that the efforts were suspended, and a counter opening having been made in the right lumbar wall, the empty cyst was drawn through it and the greater portion of it cut away. The remnant which was continuous with the portion still imbedded in the substance of the liver was sutured by its

edges into the lumbar opening. Two large cigarette drains were placed to the bottom of this cyst remnant or marsupialized pouch and the abdominal anterior wound closed in the usual manner.

The patient made an uncomplicated operative recovery. The secretion from the cyst remnant was very slight from the first. The cavity rapidly contracted and under the influence of several injections of iodine tincture the walls adhered and the sinus became obliterated.

In the Year-Book for 1912, page 37, there was reported a case of postperitoneal cyst containing bile, the history of which may be compared with the present case. It will be observed that the case now reported is a typical example of a solitary cyst of the liver. It had unquestionably formed primarily in the substance of the liver, from which it had become gradually extruded, part of it being sessile upon the under surface of the right lobe.

In connection with this case may also be put on record a case occurring in the practice of Dr. L. S. Pilcher about the year 1900.

The man was seventy years of age, which, it will be observed, was the same age as the patient in this case just reported. He was a vigorous man, of large frame, who had been conscious for some time of the presence in the umbilical region of a movable, painless mass. It finally became tender, and coincident with this tenderness, well marked and general septic symptoms developed.

Abdominal section exposed a fleshy mass of the shape and size of a large pear, free in every direction, except above, where it was joined to the liver by a pedicle as thick as an adult's thumb. Tension upon this pedicle caused an alarming spasm in the diaphragm, but a double ligature of the pedicle was ultimately accomplished and the pedicle divided. All of the septic symptoms disappeared at once after the removal of the tumor and the patient made an uncomplicated operative recovery.

Examination of the mass removed demonstrated it to be an angioma, in the centre of which necrotic areas had formed in which the septic condition, the cause of his septicæmia, had developed, the infection having been hæmatogenous in character.

Ectopic Gestation.—Three cases :

CASE I.—Hospital No. 700. A woman thirty-eight years of age. Six weeks before entrance to hospital menstruation came on as usual but did not stop. Menstrual flow had continued irregularly up to time of entrance to hospital. During this time there had been a number of severe attacks of pelvic pain.

Examination revealed uterus fixed by adhesions to a mass in the posterior cul-de-sac.

Abdominal incision revealed a ruptured hæmatosalpinx of the left tube with adhesions uniting together the pelvic viscera. The left tube with this ovary was removed together with the cystic inflammatory mass. Examination of the ruptured sac showed it to have been the seat of gestation.

CASE II.—Hospital No. 724. A woman aged thirty years. The mother of two children. Had been menstruating regularly, when she missed one period. At the expiration of what would have been the eighth week thereafter she was seized with severe pelvic pain, occurring in paroxysms of great intensity, accompanied with a slight bloody vaginal discharge. In the morning of the next day, being about twenty hours after the onset of the symptoms, she was brought to the Hospital showing all the signs of having been the subject of internal hemorrhage, which, at the time of her admission, apparently had ceased. Six hours later some reaction having been effected the abdomen was opened. On opening the abdomen an abundant escape of blood and serum took place. The pelvis and suprapubic region was filled with blood clot. When this had been hastily scooped out with the hand there was disclosed in the centre of the left tube a lacerated sac filled with blood clot, evidently the remains of a tubal pregnancy of between six and eight weeks development. A ligature was passed around the tube above and below the ruptured sac and these were tied together, obliterating the sac without the removal of any portion of the tube. While this procedure had been in progress a quart of saline solution had been injected into the cellular tissue beneath the breasts. At the close of the operation the patient was in better condition than when she was placed upon the table. After removal to bed the Murphy drip was instituted. A smooth recovery followed.

CASE III.—Hospital No. 750. The patient was a woman twenty-nine years of age. Mother of two children, the youngest two and a half years of age. Menses had been absent for two months, when there occurred a sudden onset of blood from the uterus, which was diagnosed as an abortion. Three weeks have passed since this attack, but the bleeding has continued.

When the abdomen was opened the peritoneal cavity was found to contain a quantity of free blood. In the recto-uterine cul-de-sac was found a large accumulation of free blood. The right tube was distended by a tumor the size of a grape-fruit. This was removed, and upon examination the tumor was demonstrated to be the distended tube filled with laminated clots of blood of varying ages, together with fluid blood, showing recurrent hemorrhages in the sac. No definite foetus could be identified. An uncomplicated recovery followed.

Internal Hernia with Recurrent Attacks of Obstruction.—Hospital No. 498. The patient was a woman forty-eight years of age. Mother of two children, the youngest eighteen years of age. For two years following this birth she suffered from pelvic infection, which culminated in a pelvic abscess which was opened *per vaginam* and drained. Thereafter a gradual return to a state of comfort and fair health followed. This continued until five years ago, when she developed an attack of acute obstruction of the bowels, attended with hypogastric tenderness and great pain referred to the left iliac fossa. This condition was finally recovered from without surgical interference, but since that time she has had repeated similar attacks, five in all. During these attacks the condition of the bowels is one of obstinate constipation, which ultimately yields to very strong cathartics. At the present time her bowels and bladder are functioning normally and her general condition is good, but she is in constant fear of a repetition of the attacks described. She therefore applies for such surgical relief as may be necessary to correct whatever condition may be the cause of these attacks. Vaginal examination shows the uterus to be firmly fixed in retroversion. No marked tenderness, no tumor discernible.

Upon suprapubic abdominal section the retroflexed uterus, the adnexæ and the rectum were found bound together inseparably by ancient strong adhesions. Omentum was adherent in the left tubo-ovarian region at two points. The adherent portion

was elongated so as to form two long fleshy bands. In the sigmoid flexure there was a well-marked constriction of the colon, as if it had been held beneath an enclosing band. The adherent portions of the omentum were cut away. The remnants of the left tube and ovary were enucleated and removed. The bleeding surfaces were covered over with peritoneum. The appendix was the subject of marked inflammation and was removed in the usual manner. External wound closed with a tampon drain passed down into the pelvis in the lower angle of the wound. This was removed upon the following day. Primary union of the whole wound ensued. Patient was examined twenty months after this procedure. She had been perfectly well during this period, bowels regular and general condition excellent. She now enjoys life.

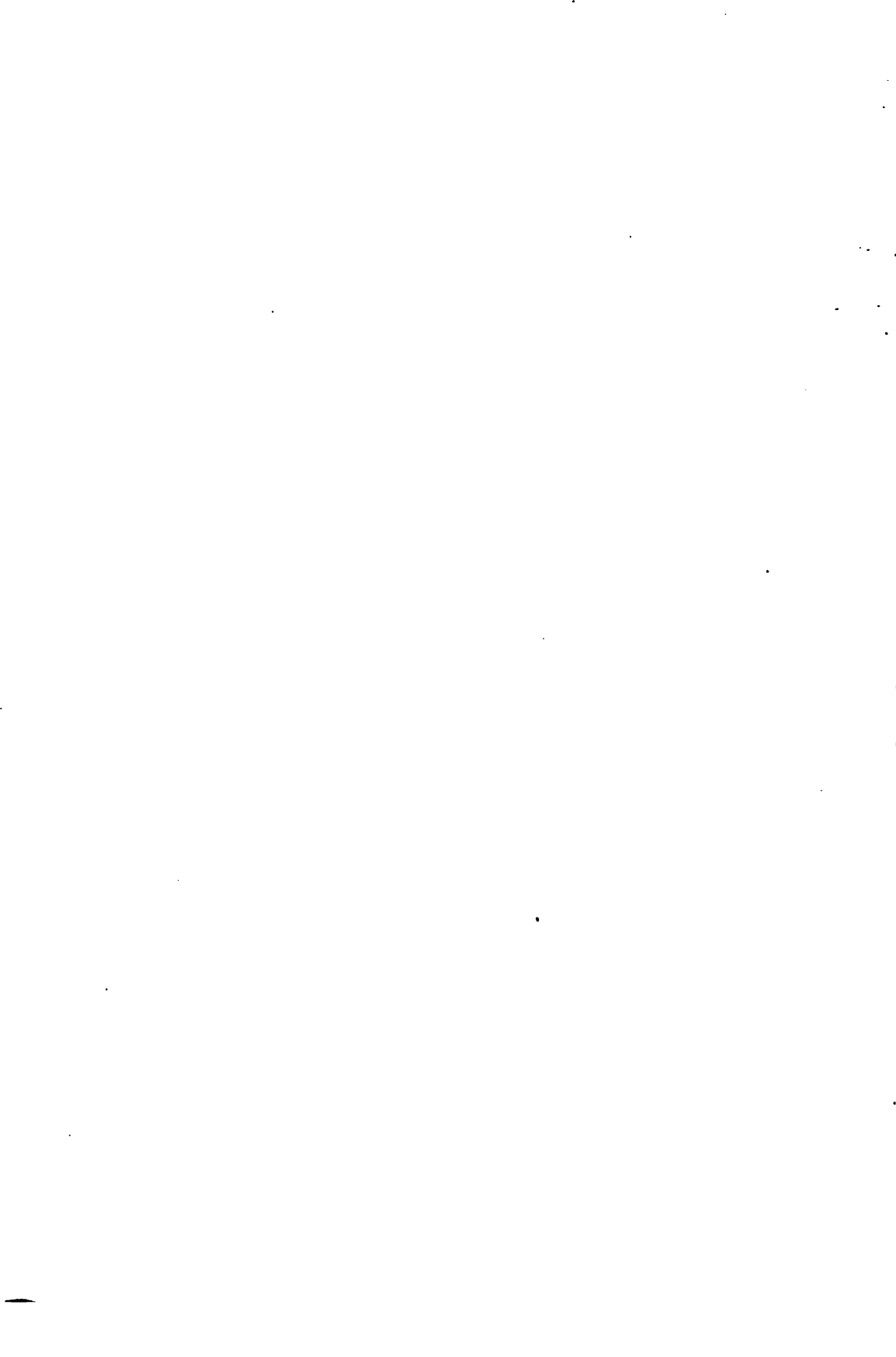
It was evident from the condition revealed at operation that from time to time the large bowel had slipped underneath the omental band found present and a condition of internal hernia been produced, causing the attacks of pain and obstinate constipation from which she had suffered, relieved only when the incarcerated loop of bowel would slip out from its entanglement.

Chronic Inguinal Sinus, Sequel to Incomplete Operation for Appendical Abscess.—Hospital No. 786. A young man twenty-six years of age, of good physique and active habits. Developed an acute appendical abscess in May, 1913, for which he was subjected to operation, which operation was simply to drain the abscess, without any attempt to remove the appendix. After some weeks of treatment this abscess closed with the exception of a small sinus. During the past year this sinus has closed from time to time, only after a short time to become distended and reopen. When admitted in October, 1914, eighteen months after the original operation, the sinus was closed but there was in the cicatrix a small fluctuating swelling, which, upon incision, evacuated a moderate amount of thin purulent fluid. The cavity was freely incised and curetted. The abscess cavity contracted but a sinus still persists. The sinus was injected with methylene blue and incision made into the adjacent skin so as to circumscribe it, and gradually deepened, care being taken to keep outside the area of color made by the methylene blue. This was continued until the incision entered the peritoneal cavity. Through the opening thus made it was found that immediately

FIG. 51.



Chronic sinus formed by ruptured appendix adherent to anterior abdominal wall.



beneath the skin containing the sinus there was an enlarged and markedly congested appendix which was adherent to the abdominal wall, and that the sinus led into the cavity of the appendix. The conditions are well shown in Fig. 51, in which are seen the inflamed and distended appendix, together with the adhesions to the abdominal wall, the sinus-bearing portion of which had been dissected out, still adherent to the appendix.

The patient made a smooth recovery and has remained well to date, a period of nine months.

Bichloride of Mercury Poisoning.—Hospital No. 761. Patient, a man thirty-one years of age in good general health. By mistake drank eight ounces of water containing three bichloride tablets, about twenty-two and a half grains, dissolved in it. Discovering what he had done at once, his residence being immediately opposite the hospital, he ran with all speed across the street and was fortunate in finding a physician in the office. Immediately he was made to vomit and his stomach was carefully washed out and a large quantity of white of egg and milk was administered. About an hour after taking the poison he passed some blood from the rectum. Aside from that, during the first twelve hours, the patient suffered but little excepting the emotional effect of his fright. At the end of twelve hours intestinal irritation with blood in the stools developed and during the succeeding hours a moderate quantity of bright blood was passed. At the end of these twelve hours he also passed three ounces of urine containing hyaline and granular casts, some albumin, no blood, specific gravity 1026. During the next eighteen hours he passed but two ounces of urine. Bloody stools, small in amount, were being passed every half-hour. His stomach was irritable, rejecting everything put into it. His general condition was that of uræmic apathy.

During the second day after the ingestion of the poison there were eighteen movements of the bowels. During the next twenty-four hours these were reduced to three, and on the fourth day, only one. Normal condition thereafter.

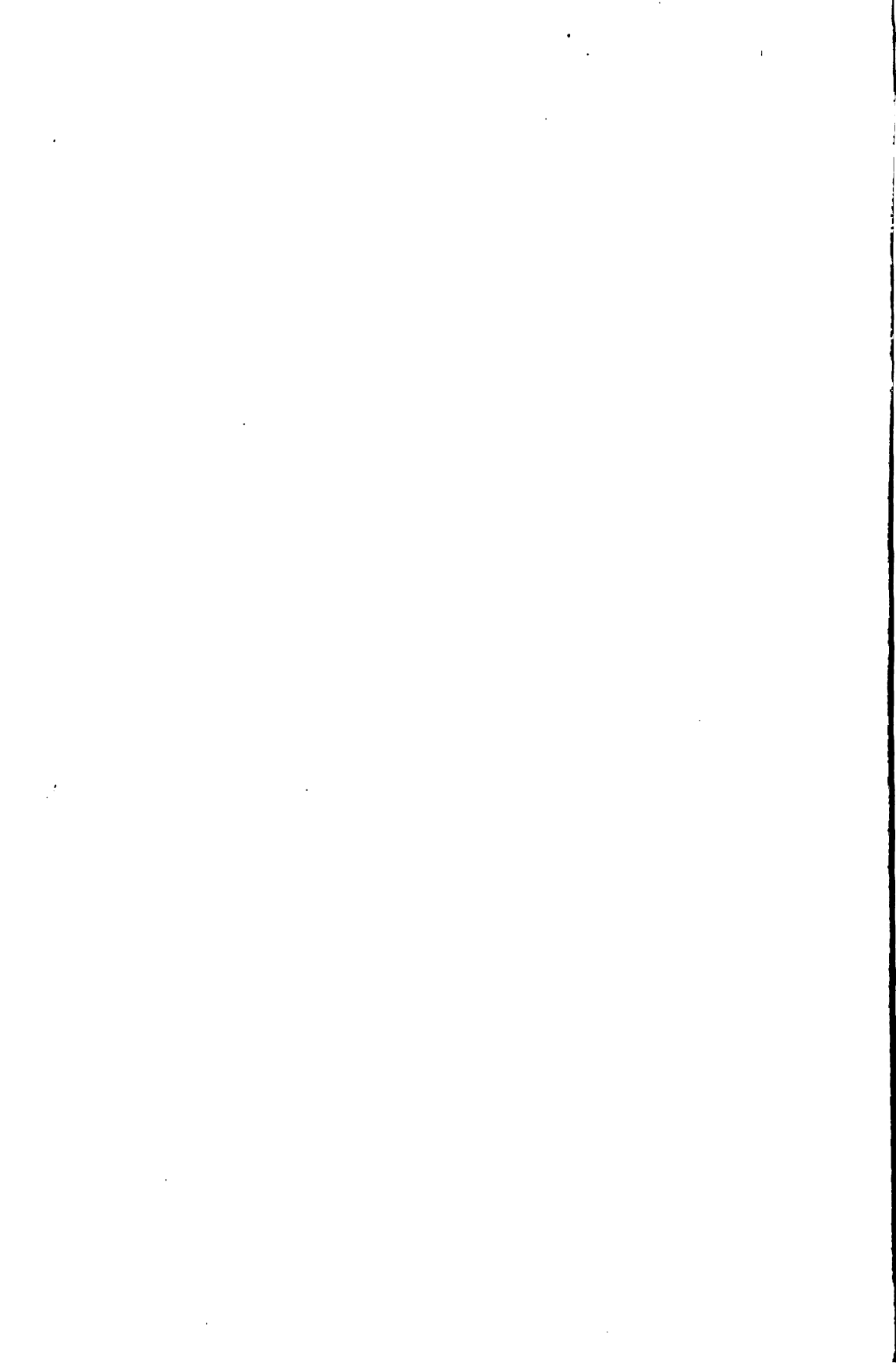
The entire amount of urine passed the first day was six ounces; the second day, nine and a half ounces; the third day, fifty-four ounces; the fourth day, ninety-four ounces, and from that time a gradual reduction to the normal amount.

During the third day, when the suppression of urine was at its

greatest point of intensity, and small bloody evacuations were taking place every half-hour, he was given a hypodermoclysis of five hundred cubic centimetres of saline solution under each breast and was wrapped up in blankets soaked in hot water, and the large bowel irrigated with a saline solution. The result of these measures was a marked relief of all symptoms and an increase in the amount of urine secreted, which, during the twenty-four hours following, rose to fifty-four ounces. The same treatment was continued upon the following day, except that for the hot pack, heating in an hot air oven was substituted. The patient perspired freely and the excretion of urine continued very active, amounting in twenty-four hours to ninety-four ounces. The blood had disappeared from the stools upon the sixth day, and the same treatment was continued. During this day he complained of some soreness of the gums, which did not amount to anything and soon passed away. During this period his diet had consisted chiefly of peptonized milk, varying with malted milk and milk toast. By the seventh day all threatening symptoms had passed away. The condition of the bowels and kidneys was normal. The patient's general strength was fair, he was out of bed. Subsequent convalescence rapid, with perfect restoration of health.

APPENDIX A.

**METHODS OF EXAMINATION AND TREATMENT IN
DISEASES OF THE ŒSOPHAGUS.**



METHODS OF EXAMINATION AND TREATMENT IN DISEASES OF THE ŒSOPHAGUS. *

BY JAMES TAFT PILCHER.

METHODS of examination available in œsophageal conditions comprise inspection, palpation, percussion, auscultation, pressure determination, sounding, radiography, and œsophagoscopy. The first three are of obvious importance, but demand no special consideration. In auscultating an œsophagus the stethoscope is placed in the epigastric angle or along the spinal column, and on liquid being swallowed a "squirting" murmur is to be heard almost immediately after the act of swallowing and is followed normally in six to seven seconds by a "squeezing" murmur as the food passes the cardia. This latter sound is changed in character, delayed or absent in stenoses or partial or complete obstructions of the canal, and is of great importance in the diagnosis of certain conditions, especially incipient carcinoma near or at the cardia.

Pressure determination was earlier used extensively to ascertain the size of a dilatation, or the presence of a spasm or paralysis, but has been completely replaced by the data obtained from radiographic examination. Probably the most feasible method was that devised by Strauss, in employing a stomach tube to the lower end of which a rubber bag is attached, which after introduction into the œsophagus was distended and the amount of air used computed. Its deficiencies are chiefly, difficulty in introduction and the lack of definite con-

* In part from article contributed to the Reference Handbook of the Medical Sciences, 3rd Ed., Wm. Wood & Co. In the preparation of this article the observations of many authorities, who have previously written upon this subject, have been freely consulted. Specific references to their work have been made in the text. We appreciate especially the privilege of quoting and reproducing the illustrations of Plummer in the section dealing with cardiospasm, and of Chas. H. Mayo in the section on œsophageal diverticula and its operative treatment. Special acknowledgment is also due to Gottstein, whose scheme of arrangement as appearing in Keen's Surgery has been quite closely followed.

clusions which can be drawn in dilatations of small calibre. Von Mikulicz also devised a cumbersome and expensive apparatus which in application proved more academic than practical in the results obtained.

The use of sounds in experienced hands is of great value. Many varieties and modifications have been introduced, but are usually applicable to individual cases only. Four types which have proven general in the scope of usefulness are the (1) ordinary conical-tipped soft stomach tubes of varying diameters; (2) solid flexible bougies; (3) thin whalebone bougies with detachable olive tips of varying shapes and dimensions; (4) fenestrated detachable olive-tipped metal sound of Plummer, with spiral-tip attachment. Among others which have found application may be mentioned fenestrated hollow sounds, Crawcour's metal sound with spiral, Leube's and Starck's diverticulum sounds, and many designed for therapeutic measures, as Schreiber's dilating sound, or that of Russell, Reichman or von Leube, the imbibition sound of Senator or Ebstein for the introduction of laminaria tents, also von Hacker's apparatus for introducing thin catgut bougies.

Technic of Diagnostic Sounding.—Use the largest and softest sound first, preferably a stomach tube, no lubricant is necessary, the abundant mucoid secretions poured out into the throat being sufficient. Advance tube with head in natural position quickly to introitus of œsophagus. The less time given the patient to realize what is being done the more readily will the introduction be accomplished. One or two endeavors to swallow causes the epiglottis to close, the musculature of the upper gullet to relax, and the back of the tongue to force the tip of the entering tube into the introitus. Continuous gentle pressure should be made introducing tube one or two inches at a time only. When gagging or straining is present do not advance tube, but wait for interval. In introducing a solid flexible bougie start with head retracted until tip is at œsophageal entrance, first having bent the tube in a curved shape, then allow head to come well forward and downward. All manipulation should be slow and without undue pressure.

From such sounding evidence may be gathered to indicate an inflammatory condition, if pain be a marked factor. This might be caused by an œsophagitis, chronic or acute, or by an ulcer or tumor; should no contracting rings be encountered, atony or a phase of paræsthesia might be inferred. It is well to remember that in some cases of cardiospasm with marked obstruction and dilatation a large tube may enter the stomach with ease. If the œsophagus prove impassable to ordinary sounds, the method of Plummer with preliminary swallowing of thread and use of fenestrated olives is the most feasible. (See the section on cardiospasm.)

Contra-indications to the use of sounds are *local*: acute inflammation of the œsophagus, manipulation after recent burns until four to six weeks have elapsed, hemorrhage; *remote*: advanced cardiac and pulmonary lesions, aneurism and cirrhosis of the liver, owing to the œsophageal varices frequently present in the latter condition.

Radiography affords opportunities of inestimable value in the diagnosis of œsophageal lesions, not only as to their character, but also as to their position and extent. Concomitant fluoroscopy has been successfully employed in the removal of foreign bodies.

Technic.—The fencing position of Holzkecht should always be employed on radiographic examinations, namely, the rays should enter obliquely from the right side behind to the left side in front. This gives one an unobstructed view of the entire gullet. There is then administered a bismuth or barium meal consisting of from two to three ounces of bismuth subnitrate, or subcarbonate, or barium sulphate, incorporated with enough mucilage of acacia to make a paste of moderate consistency which is mixed into a glass of top milk and swallowed. The exposures are taken immediately. If data are required high up, it is best to make the exposures while the patient is still swallowing. Thus, defects in muscular contraction, the extent and position of various stenoses, and the position, degree and extent of any dilatation or diverticulum can be accurately shown. (See the sections on cardiospasm, stricture, diver-

ticula, and cancer.) Tumors themselves are frequently demonstrable as slight, usually irregular shadows, even without the use of bismuth. Aortic aneurism is always recognizable although care must be taken to differentiate œsophageal tumors which may have become adherent to the aorta and which through the transmitted pulsation simulate aneurism closely.

ŒSOPHAGOSCOPY.—*Direct*.—Through direct ocular inspection of the œsophagus many conditions of disease of this organ have been noted and definitely diagnosed as to character, situation and extent to a degree that would otherwise have been impossible; by it, also, the administration of direct local treatment to the affected area has been instituted.

Broadly considered, œsophagoscopy may be said to be indicated in any case with regurgitation or abnormal sensation in swallowing, or where there may be reason to suspect the presence of a foreign body.

Contra-indications to its use are practically negative, except in instances of severe traumatic œsophagitis from previous manipulation, and in moribund states, in which class of cases it may be found more advisable to do a preliminary gastrostomy which will probably need to be done eventually any way. Again, after ingestion of caustics it is particularly dangerous to inspect the lumen of the œsophagus for several weeks, or until protective tissue has been produced to cover the eroded surfaces. Advanced general disease of the cardiac or cardiorenal system forms a contra-indication to the introduction of the œsophagoscope in all conditions except that of impacted foreign body. The dangers and mortality in experienced hands are practically *nil*, and resolve themselves into those dependent on the administration of the anæsthetic.

Several types of œsophagoscopes are used equally successfully by different men. In general, if possible, the patient should be prepared for examination as if for any other operation. Particular care should be given to mouth, teeth and faucial asepsis. Care must be taken to have any dilated portions of the œsophagus emptied of their contents, as regurgitation of this material during examination, especially if done under

general anæsthesia, may cause an aspiration pneumonia, or even immediate asphyxia.

The tube may be introduced either with the patient sitting, lying on side, or, best and most frequently employed, lying on the back with the head projecting over the head of the table, being supported by an assistant. The introduction may be accomplished, either with or without a general or local anæsthesia. Where careful manipulation is necessary to remove foreign bodies or in refractory patients, general anæsthesia is indicated. Local anæsthesia in children is particularly dangerous.

Retrograde.—This method of examination has been employed in cases where the epigastrium has been opened for exploration and may be of great value in cases where carcinoma of the lower portion of the Œsophagus is complicated by cardiospasm. By it the examiner can ascertain the exact position and extent of involvement and particularly the limits of gastric infiltration and thereby be guided in the choice of operation for its removal without subjecting the patient to the discomfiture of unnecessary oral introductions.

Technic.—The anterior wall of the stomach having been exposed through a suitable incision in the abdominal parietes, a button-hole incision is made in an avascular area of the gastric fundus, which has first been circumscribed by a purse-string suture. An ordinary direct or indirect cystoscope is introduced and the stomach inflated with air through a Davidson syringe attached to the cystoscope. Accurate definition of all gastric, cardiac, pyloric, and duodenal pathological processes may thus be obtained. At conclusion of examination the air should be evacuated and the purse-string suture drawn taut and inverted with a few Lembert sutures. The technic of this method has been fully developed by Rovsing of Copenhagen.

CONGENITAL MALFORMATIONS.—While extremely infrequent these are still of considerable surgical importance, probably not so much from an operative as from a diagnostic standpoint. The three usually met with in order of frequency of

occurrence are (1) œsophagotracheal fistula, (2) obturation from membranous diaphragm, and (3) stenosis.

Æsophagotracheal fistula are symptomatized by attacks of asphyxia during swallowing, regurgitation of fluids through nose and mouth, or continued severe dyspnœa from its entrance into trachea; foreign body bronchitis and bronchopneumonia are very likely to ensue; although many of the cases have survived some time no attempts have been made to remedy the defect. Usually, however, the condition is only one evidence of other malformations which in themselves determine the mortality. Gastrostomy is the immediate rational treatment.

Obturation is immediately recognized owing to the inability of fluids to enter the stomach. Puncture of the obstructive membrane through an œsophagoscope is the best method of procedure. The diagnosis may be made by a radiograph, or by introducing metal sounds from above and below and then taking a radiograph. A coexisting œsophagotracheal fistula may have to be dealt with.

Stenoses in the new-born are confined almost without exception to the upper portion of the œsophagus. The diagnosis is determined through the clinical evidences of difficulty in deglutition and the presence of obstruction to sounding. The treatment is gradual dilatation. Diverticula are frequently found proximal to these stenoses and should be appropriately dealt with.

The following case of congenital atresia of the œsophagus occurred in the practice of Dr. Lewis Pilcher in 1879:

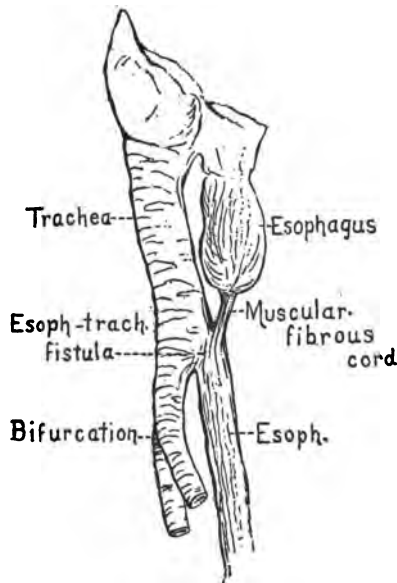
The patient was apparently a well-developed male child, weighing at birth eight pounds, of healthy parents. The first attempts at swallowing in the act of nursing provoked suffering and regurgitation. The child died after five days, from bronchopneumonia due to aspiration of food elements. At autopsy the mouth and pharynx were normal; the œsophagus, at the termination of its upper third, contracted abruptly into an impervious fibromuscular cord which continued downward in the proper track of the organ for one centimetre; here it joined a patent normal œsophagus, developed upward from the stomach to a level one and a quarter centimetres above the bifurcation of the trachea; here it blended with the posterior wall of the trachea through which a free opening existed between the lower œsophagus and trachea (see Fig. 1).

Vrolik in his *Tabulae ad illustr. embryog. hom. et mam.*, Tab. 89,

depicts a case identical with this one. Other cases may be found in literature. In all of these in which the lower part of the œsophagus is mentioned a similar communication with the trachea is recorded.

Injuries of the œsophagus are occasioned from within by foreign bodies, sounds, and efforts of dilatation; from without by shot, stab, or incised wounds. In the treatment of the former class absolute local rest is imperative and feeding must be accomplished either per rectum, *via* gastrostomy, or by stomach tube if its introduction is not hazardous. The prog-

FIG. 1.



Congenital atresia of the œsophagus.

nosis is not particularly unfavorable unless the condition be complicated by mediastinitis which occasionally follows injuries received from without and should be treated by thorough drainage through a cervical or thoracic mediastinotomy, under differential pressure if necessary. Usually the outcome is determined by the injuries suffered by the other organs in the thorax. The diagnosis is usually made by the passage of particles of food through the external wound, or by coughing being evoked through irritation of the respiratory passages by the ingested material.

Wounds.—Here should be considered (1) rupture, (2) perforation, (3) hemorrhage.

Rupture has occurred from violent vomiting of large quantities of material, as the result of lavage, consequent to injuries or spontaneously, supposedly as the result of malacia produced by hyperacid gastric contents in conjunction with marked increase of internal pressure. Gottstein believes that spasmodic closure of the inferior pharyngeal constrictors is necessary before rupture can occur. This is probably especially applicable to the last class of cases. The symptoms are severe pain in the chest, repeated retching, inability to vomit or to transmit fluids to the stomach, rapidly developing cutaneous emphysema of the neck and death usually within twenty-four hours. Treatment under differential pressure might prove efficacious.

Perforation may occur from within or without. As a rule, its development is gradual. The structures perforated into are usually the large vessels, the mediastinum, or the lower air passages, and are the results of various œsophageal lesions, as ulceration proximal to strictures, or those the result of foreign body necrosis, or from traction diverticula and infrequently from cardiac ulcers resembling in character the chronic gastric ulcers. The secondary perforations from without into the œsophagus are the terminal results of pressure necrosis from aneurism or necrotic process involving adjacent thoracic viscera. Diagnosis is to be made with certainty only in those cases involving the respiratory tract when by the method of Gerhardt, of noticing air passing through a tube introduced into the œsophagus, one may be sure of communication of an air passage with the œsophagus. The treatment consists of temporary gastrostomy and subsequent operation under differential pressure to disconnect the fistula and infold the œsophagus or to drain the mediastinum.

Hemorrhage from the œsophagus may occur from carcinoma, ulcer, varix (the result of cirrhosis of the liver), burns, foreign bodies, perforation and from ruptured aneurism. When profuse it is particularly fatal. Its source can only be ascer-

tained, and that with the greatest difficulty, by inspection through the œsophagoscope, or through retrograde œsophagoscopy, and attempts may be made to tampon it through this instrument; symptomatically, astringents, as iron, adrenalin, styptol, ergot, ice, etc., have been suggested but are seldom effective. The bleeding area may possibly be compressed by an inflated rubber bulb, or the use of such an instrument as Schreiber's dilating bougie.

FOREIGN BODIES IN THE ŒSOPHAGUS form by far the largest class of surgical affections of that organ, as practically anything which can pass through the pharynx may become lodged either permanently or temporarily in the œsophagus. Such bodies become of clinical interest only when they become impacted, and thus interfere with deglutition, or cause pain, or produce complications through puncture of the walls, or initiate stricture formation.

Predisposing causes to the lodgement of foreign bodies in the gullet are loss of teeth, or paralysis of the facial muscles, lips, tongue, pharynx, or œsophagus, various inflammations of the postbuccal region, also strictures, growths, malformations of the organ, youth, and insanity.

Sites of election are usually at the points of physiological constriction, namely, at the level of the cricoid, at the point where the left bronchus crosses the gullet and above the hiatus œsophagi.

Symptoms are varied and may range from practically no discomfort to nausea, vomiting, or pain on deglutition, dyspnoea, or even asphyxia. Much depends on the character of the ingested body or its position in the gullet. Stabbing pain usually denotes puncture of the mucous membrane. Again, merely a feeling of retrosternal pressure may be experienced. The pain complained of does not always correspond to the level of the impacted body, and may even be due to the injury inflicted by the body in passing.

Diagnosis may usually be most readily made by the history and by a consideration of the subjective symptoms. Occasionally one can palpate a large body by lateral pressure on

the neck, or through digital palpation through the pharynx. The introduction of a soft tube probang or bougie, may locate the level of the obstruction, but the greatest caution must be exercised in the blind introduction of these instruments, as perforation has been repeatedly caused in this manner, or the object dislodged from a favorable position above the level of the crossing of the bronchus to one below it, which situation is much less accessible, or it may be caused to become more firmly impacted. This method would best be reserved for use only in those cases where soft objects form the obstruction, in some of which instances the manipulator may be successful in pushing the body on into the stomach or possibly have it ejected through the efforts to vomit which may be stimulated. Radiography and fluoroscopy have proved of the greatest value in locating objects refractive to the passage of the rays. The transillumination or photograph should be taken in the fencer position.

The most successful method, however, at our command both from the point of diagnosis, as well as treatment of foreign bodies lodged in the œsophagus, is œsophagoscopy.

Treatment should never be instituted until the most exhaustive efforts have been made not only to verify the diagnosis, but to ascertain to a certainty the situation and nature of the obstruction and its relative position within the canal. The treatment may consist of either non-operative or operative measures.

Non-operative extraction: In cases where the obstruction causes asphyxia, it is always situated at the introitus of the œsophagus and can usually be removed either by the finger, or by a pair of curved forceps. Tracheotomy must occasionally be performed as a temporary measure. The following case in the practice of Dr. Lewis Pilcher illustrates this indication and shows the complications that may attend such a case in a young infant.

An infant of fourteen months while playing on the floor was observed to suddenly become choked. The finger of its mother thrust into its mouth dislodged therefrom a piece of meat, but the dyspnœa persisted.

Inspirations were labored and difficult and there was much restless-

ness. At the end of eight hours, the condition becoming continually more aggravated, the trachea was opened through the cricoid and upper tracheal rings. Respiration then became easy. The cause of the obstruction was not apparent at the time but was supposed to be due to some acute inflammatory condition of the glottis. During subsequent days repeated attempts to do without the tube were ineffectual. On the eighteenth day after the opening of the trachea, during an attempt to do without the tracheal tube, an unusual spasm of coughing and gagging occurred. The child was turned upon its face to facilitate the escape of mucus, whereupon a flat triangular shaped piece of bone five-eighths of an inch long and half an inch broad was expelled from the mouth. This was recognized as a bit of pork rib which had been attached to the morsel of meat originally swallowed by the child, the meat having been removed by the mother, while the fragment of bone remained impacted in the entrance of the œsophagus and trachea.

Notwithstanding the escape of this fragment of bone, the resulting inflammatory and ulcerative condition at the entrance of the trachea had been so pronounced that use of the tracheal tube for breathing purposes was necessary for months thereafter.

During this period the child grew and developed well, and at the expiration of a period of five months and twenty-two days after the original opening of the trachea and introduction of the tube it was finally possible to do away with the tube. The sinus quickly closed, and the child regained robust health.

This case occurred in 1875. The child grew up to manhood.

The practice of evoking emesis has been referred to incident to the introduction of bougies and its indiscriminate use cautioned against. If it is indicated, however, it may be caused by rectal injections of tobacco, as suggested by Poulet, by hypodermic injection of apomorphine, or probably best by titillation of the uvula. When the obstructing substance is of such a nature as to lend itself to digestion or shrinkage, the former may be accomplished by administering a solution of pepsin or papain and hydrochloric acid, or the latter by having the patient drink strong cognac. Many instruments have been devised for the removal of foreign bodies from the œsophagus. Among them may be mentioned the forceps designed by Gutsch, Eckholdt, Bond, Burge, Cloquet, Cusco, Mathieu, and Gama. Other instruments used are Petit's hook, Graefe's coin-catcher, or the ring coin-catcher. These have all been used repeatedly and successfully, as have the bristle probang and the horsehair parasol snare in many instances. The simpler methods failing,

recourse must be made to the œsophagoscope. Many instances will occur when even the manipulation through this instrument will prove ineffective and open operative intervention be indicated.

Operative removal: This resolves itself into five methods of approach, according to the situation of the foreign body; (1) œsophagotomy (high), (2) œsophagotomy (low), (3) gastrotomy, (4) cervical mediastinotomy, (5) posterior thoracic œsophagotomy. The technic of these procedures will be considered later on under the caption of operative methods.

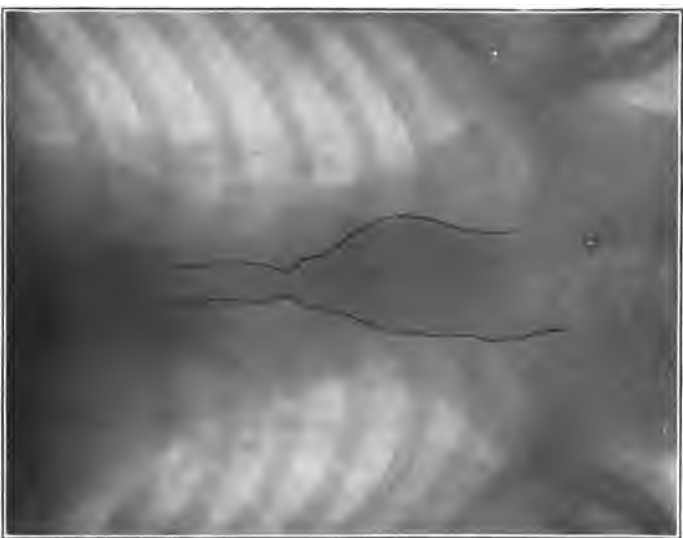
Complications depend greatly on the size, nature, and situation of the foreign body. Probably the most frequent immediate trouble is that caused from hemorrhage, which is particularly difficult to control when profuse. Direct ligature or tying of the carotid in the lower third has been suggested. Empyema, pyopneumothorax, local abscess, pericarditis, openings into the trachea and bronchi and even into the thoracic aorta have occurred from perforation at the site of impaction due to the resultant necrosis; œsophageal fistulæ have also been formed.

Prognosis is relatively bad if the object is not removed early. Cutaneous emphysema is almost invariably followed by a fatal issue, while in all cases of abscess formation the prognosis is unfavorable. The usual operative measures for their relief are of course indicated.

ŒSOPHAGITIS.—Local inflammation of the gullet may be produced through chemical, thermal, or mechanical processes, or be a sequel to some of the exanthemata. The most important of this class may be termed

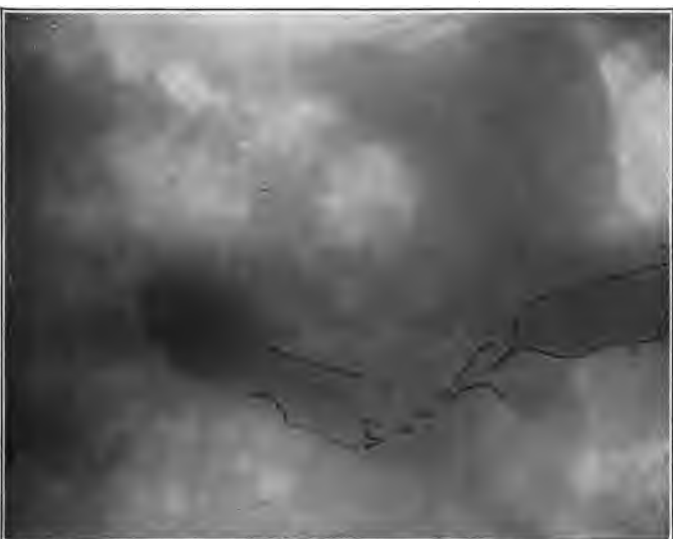
Toxic or corrosive œsophagitis, caused by swallowing caustic soda, lye, or acid, may be either superficial or deep in character, usually dependent upon the degree of concentration of the substance ingested (Fig. 2). The diagnosis is usually made from the history and buccal inspection. The treatment should be immediate and thorough. If possible to introduce a stomach tube easily, the stomach should be repeatedly flushed out with the antidote for the poison taken; thus, in cases of

FIG. 2.



Radiograph of cicatricial stenosis caused by lye. Note the smooth margins and the proximal dilatation of the esophagus.

FIG. 3.



Radiograph of typical case of cardiospasm engrafted upon a carcinoma of the cardia. Note the smooth wall of esophagus with its dilatation proximal to the typically pointed cardia, distal to which is the moth-eaten cardiac end of the stomach through which the bismuth trickles irregularly.

FIG. 4.



Radiograph in a case of typical cardiospasm, showing diffuse fusiform dilatation of the esophagus, with peculiar characteristic pointed distal end.

FIG. 5.



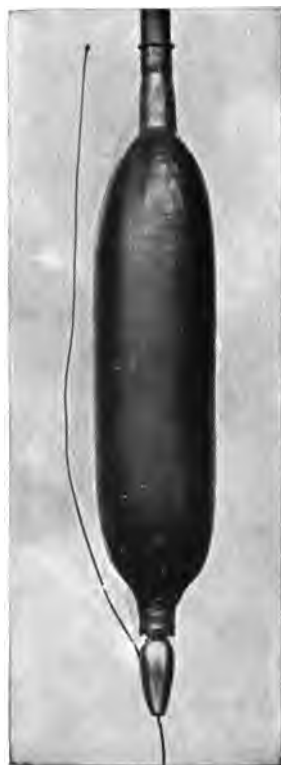
Radiograph in a case of typical cardiospasm, showing diffuse fusiform dilatation of the esophagus, with peculiar characteristic pointed distal end.

FIG. 6.



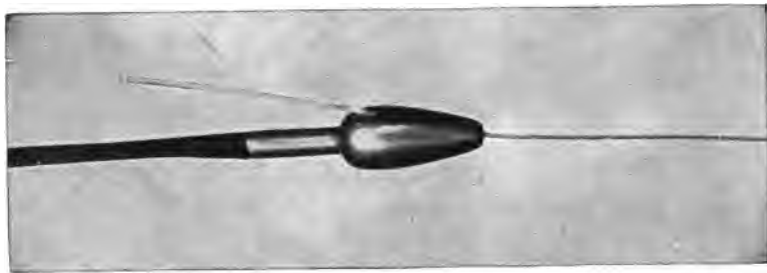
Radiograph of case of typical cardiospasm, showing diffuse fusiform dilatation of oesophagus, with peculiar characteristic pointed distal end.

FIG. 7.



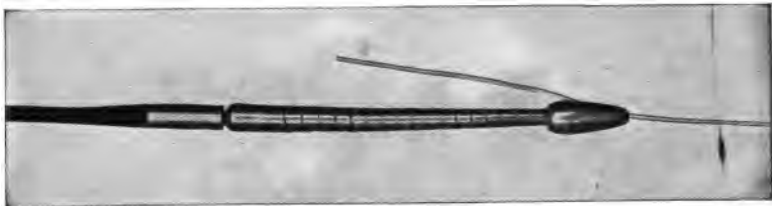
The Plummer hydrostatic dilator inflated and fenestrated olive tip threaded.

FIG. 8.



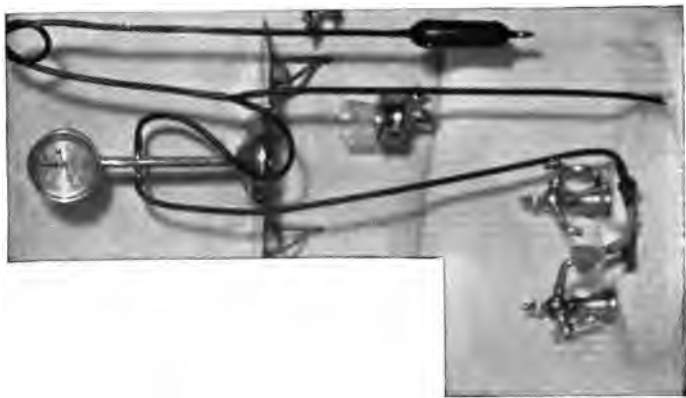
Fenestrated olive for carrying thread or wire guide (Plummer).

FIG. 9.



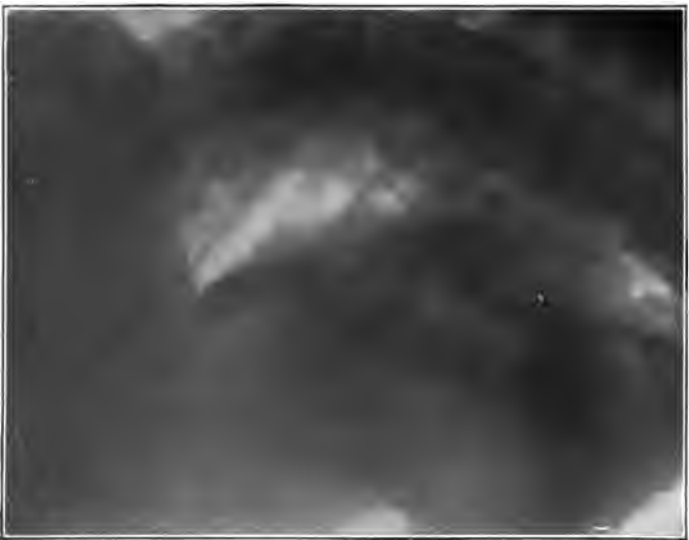
Spiral tip used in conjunction with the fenestrated olive, indicated in tortuous strictures (Plummer).

FIG. 10.



Hydrostatic dilator, showing arrangement of tubing and attachment (Plummer).

FIG. 11.



Radiograph of carcinomatous strictures of the thoracic esophagus, with proximal dilatation. Note the irregular ragged or moth-eaten edges, or even entire absence of shadow.

FIG. 12.



Radiograph of diverticulum of esophagus injected with bismuth (Mayo).

FIG. 13.



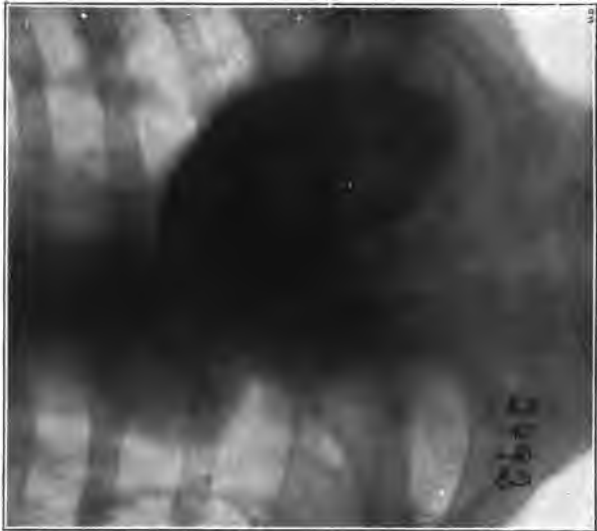
Radiograph of diverticulum of oesophagus injected with bismuth (Mayo).

FIG. 14.



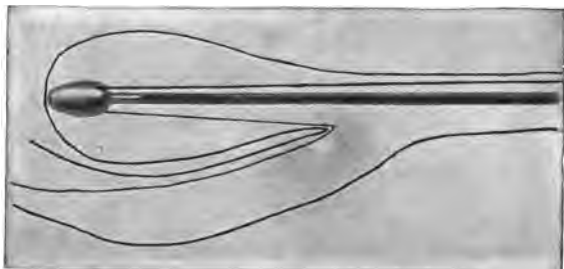
Radiograph of diverticulum of the oesophagus injected with bismuth (Mayo).

FIG. 15.



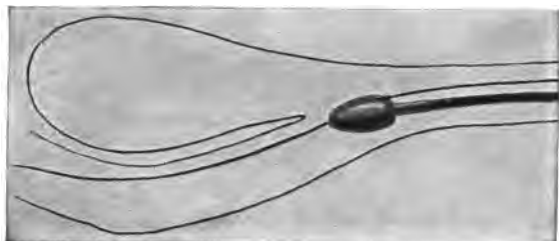
Radiograph of diverticulum of esophagus injected with bismuth (Mayo).

FIG. 16.



Sound pocketed in a low diverticulum but threaded over guide string (Plummer).

FIG. 17.



Illustrates how the depth of the diverticulum may be accurately ascertained by traction on the string lifting the sound out of the diverticulum and over the lip into the esophagus (Plummer).

acids, an alkali should be employed, as soap solutions, sodium bicarbonate, calcined magnesia (wall plaster), or food given to bind and thus render inert the irritant—eggs, or milk, or both are the best to use; sweet or olive oil is indicated, as it serves to protect the mucosa from further injury. When the poison is of an alkaline nature, as in the use of lye or caustic soda, acids should be administered—probably best dilute vinegar—and then the use of milk and oil. As a result of the more severe corrosions there may follow complete occlusion of the œsophagus, or the stomach may be in so precarious a condition as not to tolerate any material in it, or a complete occlusion of the pylorus may result. The surgeon must be guided, therefore, according to the situation and extent of the lesion as to whether a gastrostomy or jejunostomy is imperative. The interval treatment is purely symptomatic. Sounds should under no consideration be used until after one month has elapsed, best wait six weeks, and even then they should not be employed if there is any fever or evidence of active inflammatory reaction in the œsophagus, as tenderness, pain, blood streaks in vomitus or saliva.

Acute catarrhal œsophagitis is also quite frequently encountered following the ingestion of very hot fluids, or as a result of sounding, or the swallowing of foreign bodies, and is symptomatized by fever, lancinating pain on deglutition and a viscid tenacious secretion. The treatment is symptomatic, and prompt recovery in a few days usually ensues. No local instrumentation should be used.

Phlegmonous œsophagitis is of rare occurrence. Its etiology is given as being the resultant of foreign bodies, corrosions, phlegmon of the stomach, rupture from periœsophageal purulent foci, and lacerations of the mucous membrane after violent vomiting. A diffuse and circumscribed form is described. The diagnosis is seldom made. The symptomatology consists of fever, chills, dysphagia, dyspnœa, and purulent expectoration. The prognosis is unfavorable. Treatment resolves itself into drainage of the foci, if they can be located,

either by puncture or by incision of the mucosa through an œsophagoscope.

Chronic catarrhal œsophagitis may either originate as such, or be the result of an acute process. It is frequent in chronic alcoholism and in habitual smokers, or may be associated with adjacent chronic processes of a similar nature of the pharynx or stomach. A more or less severe grade is usually present in most all mechanical conditions affecting the gullet, as stricture, diverticula, or spasm, and is frequently present due to passive congestion in cardiac, renal, and hepatic disease. The symptoms are slight and usually merely a burning sensation of mild character in the œsophagus is experienced, accompanied by occasional transient interference with deglutition.

In this category might well be considered those affections of the œsophagus noted after some of the acute contagious and infectious diseases, as diphtheria, scarlet fever, typhoid, small-pox, thrush, etc., in which infiltration of the tissues to a moderate degree occurs and occasionally pseudomembranous casts are desquamated. Local cleansing with weak boric acid solutions (three per cent.), and removal of obstructing masses with a stomach tube or soft mandarin, or by the induction of emesis, is usually all the condition requires.

ULCERS AND FISSURES.—The former are usually of superficial character and consequent to an associated chronic inflammation. The chronic perforating type is considered under wounds of the œsophagus. The treatment of the class considered here is chiefly rest, local application of stimulants, as silver nitrate on a swab introduced through an œsophagoscope, and the administration per os of bismuth subnitrate or subcarbonate. Fissures are usually the result of instrumentation, or the passage of foreign bodies, and are located at the points of physiologic constriction, more frequently at the cardia probably than elsewhere, in which situation they occasionally cause local spasm, for the relief of which applications of silver nitrate, ten per cent., and bismuth may suffice, or even temporary gastrostomy may have to be performed in the more resistant and troublesome conditions.

MOTOR DISTURBANCES OF THE ŒSOPHAGUS.—These are encountered probably more frequently even than the occurrence of foreign bodies, when their symptomatology is appreciated and the proper measures instituted to assist the examiner in making a correct diagnosis. Those phenomena will be considered which result from acute, intermittent, or continuous spastic contraction of the œsophageal musculature in varying locations in the organ and of the type presented which may be either the result of functional or organic disturbances.

There are some other disturbances of the œsophageal musculature in the nature of complete or partial paralysis which are much more rare in occurrence.

Œsophageal paralysis has occurred as one of the sequelæ of diphtheria, in the course of hemorrhage, softening, tumor or sclerosis in the brain, pressure from enlarged lymphatic glands on the vagus nerve, disease of the vertebræ, chronic alcoholism, lead poisoning, and syphilis. The condition is symptomized by immediate regurgitation of ingested material, disturbance of the swallowing sounds is to be noted, and radiographic examination shows evidences of atonic dilatation. The treatment resolves itself into feeding through a tube and treatment of the causative factor. The prognosis is not essentially bad.

Œsophagismus, or spasm of the œsophagus, when considered as an entity, is a relatively common condition, especially the paroxysmal type. It may be conveniently classified relative to anatomic distribution into (1) cricoid spasm, (2) spasm of œsophagus proper, and (3) cardiospasm. Relative to its etiology the classes of (1) idiopathic, (2) reflex, and (3) tonic spasm should be considered.

Cricoid spasm is probably the most frequent of occurrence, and is a term introduced by the writer to denote a contraction of the circular muscular fibres at the introitus of the œsophagus, which is in close relation to the cricoid cartilage. Its etiology is more commonly neurotic in its nature, but severe and protracted cases are also found in smokers and alcoholics in whom there is usually an accompanying chronic œsophagitis. Tuberculosis of the larynx or other local inflammatory processes fre-

quently cause cricoid spasm, as do ulcers, strictures, tumors, or fissures lower down, the so-called globus hystericus is merely a common name for this condition. The diagnosis is usually easily made in the absence of any other local trouble. On direct œsophagoscopic examination the introitus appears as a firm, tight rosette. Passage of a sound or stomach tube frequently allows the examiner to experience the sensation as if the instrument were passing a narrow canal; occasionally the muscle will grasp the tube spasmodically. The symptoms consist of retromanubrial cramps with radiation to the shoulders and back of the neck, and a more or less severe grade of dysphagia according to the condition. Occasionally swallowing is impossible, but one of the characteristic signs is the varying degree of permeability present at short intervals. The condition tends to recur frequently. The treatment consists of sounds, dilatation, electricity, local and general analgesics, and sedatives.

Œsophageal spasm, or contraction of the entire œsophagus, is frequent but usually of a very transitory nature. It is invariably preceded by spasm at the introitus and its etiology and treatment coincides with that of pathological muscular contraction at that point, as previously described. The symptoms differ in that the cramp begins at the level of the cricoid and progresses downward to the cardia, and radiation of the pain continues down between the shoulders and to the epigastrium. It usually takes one or two minutes for the spasm to relax. Tonic spasm of the œsophagus has been noted as a complication of several conditions, chief among which may be mentioned rabies, tetanus, hysteria, and epilepsy. In the two former it is of serious import; in the latter conditions it is usually transitory in nature.

Cardiospasm; Phrenospasm.—The resultant of this condition was first noted post mortem by Von Ziemssen and Zenker in 1874, when they published their observations on cases of idiopathic dilatation of the œsophagus, but it was not until 1882 that Mikulicz first attributed it to the presence of a muscular spasm at the cardia. During the past five years, however,

the recognition of the condition from its clinical picture and its treatment have been so much more frequent and the latter so greatly developed, that several hundred cases have been recorded during this period. The name thus far applied to it, cardiospasm, is probably incorrect owing to the varying ideas as to its etiology which have been promulgated from time to time, as in addition to the above nomenclature we have offered (1) diffuse dilatation of the Œsophagus without anatomic stenosis, (2) fusiform, (3) idiopathic, (4) uniform diffuse, and (5) spontaneous dilatation. Relative to the etiological factor involved a similar dissimilarity of ideas exists, thus (1) primary cardiospasm, (2) primary atony of the Œsophagus, (3) vagi degeneration, (4) congenitalanlage, (5) Œsophagitis, (6) kinking at the hiatus Œsophagi, (7) congenital or acquired asthenia, (8) pressure occlusion from spasm of the diaphragmatic crura, and (9) secondary to ulcer or cancer of the stomach (Fig. 3), gall-stones, appendicitis, etc.

The condition may be either acute or chronic. The former is quite frequent, but of transitory nature, and is usually the result of an hyperacidity of the stomach or some corresponding irritant. It resembles the Œsophageal spasm in general and seldom needs other than symptomatic treatment. The chronic form is, however, productive of pathological changes in the Œsophagus and eventually causes a diffuse dilatation usually extending the entire length of the Œsophagus; the walls become thickened and a general chronic Œsophagitis ensues. There form papillary excrescences, erosions, and scars which from the chronic static irritation to which they are subjected offer an exceptional nidus for the development of cancer.

Symptomatology.—This develops along three distinct lines according to the stage of the condition present, and after completion of the pathologic changes a definite practically pathognomic triad is presented: (1) early spasmodic pain, followed after months or years by (2) regurgitation, and this in turn subsequently followed by evidences of (3) retention. The first stage is characterized by retrosternal discomfort and oppression, retroxiphoid cramping, and sensations of choking. The second

stage by immediate post-prandial regurgitation and a more continuous though frequently milder sensation of tightness in the region of the cardia, with acute exacerbations at times. In the third stage the ingested food is retained longer in the dilated œsophagus and is only regurgitated at irregular intervals after eating.

Many variations of this complex picture are present in different cases. The discomfort may be located in the epigastrium, it may radiate to the back or not at all, it may be referred to the left hyponchondrium or higher up in the œsophagus. The most frequently used expression is that the food seems to "stick behind the breast-bone." Again, these subjective sensations may occur entirely independently of food intake. Later the spells of vomiting immediately after eating occur at intervals only and between them no discomfort at all may be experienced. Still later after dilatation has occurred the earlier part of the meal is usually retained, spasmodic cramping has usually disappeared and what is regurgitated is merely from overflow. These patients frequently complain of fluid gushing out on the pillow after they are asleep, an observation which should be very suggestive.

Diagnosis from Objective Examination.—Plummer lays down the following points which should be demonstrated in the diagnosis and study of a case of cardiospasm: (1) The food is regurgitated from the œsophagus and not the stomach; (2) the existence and character of obstruction at the cardia; (3) the presence or absence of œsophageal dilatation and its shape, size, etc., and (4) the presence or absence of gross lesions in the œsophagus or neighboring organs which might excite cardiospasm.

In demonstration of these points he advises that the following measures be resorted to: (1) The various stomach-tube tests, including the methods proposed by Rumpel, Kelling, and Einhorn; (2) passage of a bulbous sound on a whalebone staff; (3) the passage of the Plummer sound; (4) radiographing a bismuth mixture in the dilated œsophagus (Figs. 4, 5, and 6);

(5) determination of the size of the dilatation, Strauss' method, and (6) œsophagoscopic examination.

Treatment consists of symptomatic and dietetic measures which need not be detailed; the removal of any extra-œsophageal irritating factor, as gall-stones, ulcer or cancer of stomach or appendix, etc., if possible; or dilatation either by hydrostatic or mechanical means, or by open operation directed to the cardia itself. The hydrostatic dilator of Plummer being the most effective and simplest method, detail description will be given of it only.

The external construction of this apparatus may be seen in Figs. 7 to 10. The description of it and the method of its application by the originator states that it is made by cementing a rubber-dam balloon to one end of a piece of non-elastic rubber tubing in such a manner that the tube just passes through the balloon. A number of holes are so punched in the tubing that its lumen connects with the interior of the balloon. A sausage-shaped silk bag is drawn over the balloon to preserve its shape on distention. Several sizes, ten centimetres long and from twenty millimetres to forty millimetres in diameter, are provided. A second rubber balloon is drawn over the instrument to facilitate its introduction. If the dilator is slightly constricted in its middle third, the tendency for it to slip into the stomach is lessened. Provision is made for removing the staff to prevent its maceration when not in use. The metal tip of the staff is threaded for the set of fenestrated olives used in sounding (Fig. 8) and for the spiral tip if its use is indicated. The dilator is connected by rubber tubing with a water-tap or pump. Into this tubing two hard-rubber T-joints are inserted, one for an altitude gauge or manometer, and the other for a piece of tubing to permit draining the instrument without disconnecting at the tap, and for controlling the pressure (Fig. 10).

As a preliminary to the use of this hydrostatic dilator, Plummer has perfected a method, earlier suggested by Russell, of having the patient slowly swallow six yards of a silk thread which when threaded through the fenestrated olive acts as a

guide. This passes through the coils of small intestine, becoming engaged in them so that the string cannot be pulled out on being drawn taut. It is advisable to have the patient swallow three yards at first and the remainder after an interval of twelve hours, as snarling may be anticipated if it is all taken at once.

The position of the cardia having been previously accurately determined, the olive is threaded on to the string and the dilator introduced sufficiently far for the cardia to engage the balloon at its middle third. The instrument is held firmly with the right hand, the index-finger resting against the teeth to prevent the dilator being drawn into the stomach. The tap is now opened enough to fill the instrument and deliver a good stream through the tubing for draining the balloon, but not to indicate any pressure. The pressure is now slowly raised by pinching the drainage tube with the fingers of the left hand. This is continued until the gauge registers 575 millimetres, which has been found to be sufficient in the great majority of cases and still be within the limits of safety. The number of dilatations averages between one and five. The interval between them should be from four to five days.

The mechanical dilator consisting of parallel blades covered by a rubber-dam and operated by a screw externally, devised by Einhorn, has also been used repeatedly with success, but the danger of rupture is much greater than that experienced with the use of Plummer's apparatus and the accuracy of the latter is appreciably greater.

There are, however, certain cases which are resistant to repeated attempts at dilatation, or in which the manipulator may have been unable to enter the cardia; these, then, must be treated by open operation. Three such methods have been advocated and successfully carried out: (1) Mikulicz's method of gastrotomy with introduction of covered forceps through cardia from below and divulsion; (2) Meyer's method of oesophagoplication and vagolysis, and (3) Wendel's method of cardioplasty in which he adopted the technic of pyloroplasty by the Heineke-Mikulicz method. Finally palliative gastrostomy

may be the only course left owing to the exigencies offered in certain cases.

STRICTURE OF THE ŒSOPHAGUS.—This may be a resultant of many diverse factors. Those most continuously met with are: (1) Congenital stenosis, (2) membranous obturation (see the section on congenital malformations), (3) obstructive (see the section on foreign bodies), (4) external pressure (mediastinal tumors), (5) spastic contraction (see the section on motor disturbances), (6) those consequent to cicatricial formation, and (7) those caused by involvement of neoplasms. The last two will be considered in this section.

Cicatricial stenoses are usually caused by the swallowing of such substances as lye, caustic soda, or acids. Syphilitic hyperplasia is also occasionally found. They are ordinarily symptomatized by an increasing inability to swallow, first solids, later fluids, or the recognition of serious trouble may be delayed until attention is drawn to it by the subjective and objective symptoms consequent to a proximal dilatation or diverticulum which has been formed.

Treatment is either mechanical or operative, the former consisting of the introduction of sounds of increasing diameter. In tortuous strictures the utilization of Plummer's string method and spiral guide may facilitate the introduction of the dilating apparatus which would otherwise be impossible. Many impermeable strictures will relax sufficiently to admit a bougie after a temporary gastrostomy and the œsophagus thus put at absolute rest for some time. Koenig's method of dropping silver balls of increasing size onto the stricture which are allowed to remain in over night has resulted in marked relief. The introduction of a Symond's permanent cannula after the method of Mixter has allowed many cases to live in comfort and thus obviated a gastrostomy. The introduction of catgut bougies through a von Hacker cannula is frequently possible when the passage of a small sound is not.

The entrance of sounds through a stricture from above having been found impossible, several ingenious methods have been evolved which necessitate an opening in the stomach. The

most practical and the one which seems to have given the best results is the method of Abbe, viz., retrograde dilatation through gastrotomy. A gastrotomy is done and a fine whale-bone bougie introduced from below upward until it protrudes from the mouth or through a previously made external incision above the stricture. A stout thread or piece of braided silk is then drawn through, and, after making the stricture tense by introducing a conical bougie, the string is pulled up and down, sawing through the stricture, and as the cicatricial tissue gives way the bougie may be introduced further and further until it slips through; subsequent passage weekly of a full-sized bougie effects a prompt cure. Ochsner also obtained good results from drawing a rubber tube caught in the middle and drawn out taut to diminish its diameter to the caliber of the stricture aperture and pulling it up through the stricture, employing successively increasing sizes of tubing as the progressive dilatation of the stricture allows. The Hacker-Socin-Mikulicz method is founded on the same principle except single tubes are used in increasing diameter, which are allowed to remain from one to two weeks before the next size larger is introduced. Eiselsberg employs a conical rubber tube in the same way. It is possibly more convenient to handle this after it has once been introduced and tolerance established.

Internal œsophagotomy with an instrument of the Maison-neuve type has practically been discontinued owing to the dangers involved and the lack of control of the depth of the incision or its exact location, and the frequent hemorrhage following. Any cutting should be done under direct inspection through an œsophagoscope. The use of electrolysis is of questionable value.

Three types of open operation have been practised successfully in those cases in which the stricture resisted all of the above detailed methods to enter and dilate it: (1) external œsophagotomy or œsophagectomy in the cervical region, (2) thoracic mediastinotomy with secondary œsophagectomy, and (3) œsophagogastric anastomosis with low, œsophagectomy

under differential pressure. (See the section on operative methods.)

Strictures of the œsophagus by neoplasms may be either benign or malignant in character. Benign tumors are rare and but infrequently diagnosed. They consist chiefly of cystomata, caused by retention in the mucous follicles, papillomata, fibromata, myxomata, myomata, lipomata, and adenomata. The diagnosis is usually possible only by the use of the œsophagoscope, although occasionally pedunculated tumors have been forced up into the pharynx and thus recognized. Papillomata may occur anywhere along the tract of the gullet. They are noted most frequently in elderly people and are frequently multiple. These three observations hold good as a whole for all other benign growths. Their symptomatology is quite variable, causing in some instances practically no trouble whatever, in others with seemingly less involvement severe attacks of dysphagia and even dyspnoea. Their treatment consists in removal or puncture in the case of cystic formation. When the growth is pedunculated it can conveniently be cut through an œsophagoscope, or if it can be delivered into the pharynx it may be grasped and either cauterized or snared off. External œsophagotomy may be found necessary, or even gastrotomy, if there is great emaciation. In instances of asphyxia tracheotomy may become essential.

Malignant tumors involving the œsophagus consist of two varieties, sarcomata and carcinomata. The former are very rare, occurring as a rule in old people. They may be either primary or secondary, the former occurring at the introitus œsophagi, although they have been noted at the constriction opposite the tracheal bifurcation. They are generally of the round-celled variety. Symptoms produced by this growth are slow in developing and no treatment other than the exhibition of Coley's mixed toxins has been attempted. It is doubtful if surgical removal is indicated, if the examiner is sure of the diagnosis.

Carcinoma is a condition affecting the œsophagus more frequently than any other pathological alteration, its incidence

has been placed at 80 per cent. The seat of involvement is usually in the region of the cardia (70 per cent.), next at the introitus (15 per cent.) and the thoracic segment is involved in approximately 15 per cent. of the cases. It occurs more frequently in men than in women, approximately in the ratio of 3 to 1. The majority of cases being found between the ages of forty-five and fifty-five, indeed, the fortieth to the forty-fifth year, seems to divide œsophageal cases into two groups. In the earlier period carcinoma is very rare, while in the latter group it is by far the most common affection. It frequently supervenes upon a preëxisting benign condition, such as tubercular or simple ulceration, cicatricial strictures, diverticula, chronic œsophagitis, or cardiospasm. Stress has also been laid on the frequency of its occurrence in cases subjected to continued mechanical irritation, and in those addicted to tobacco and alcohol. Chemical and thermic factors should also be considered.

The pathological picture in its entirety consists of infiltration, growth, obstruction, destruction, ulceration, and contraction. The carcinoma may be either primary or secondary by contiguity, metastasis from other foci does not appear to occur in this organ, autoimplantation has, however, been noted. The character of the typical œsophageal growth consists usually of epitheliomatous proliferation. Of rarer occurrence is cancer of the glandular and colloid type. The progress of extension is peculiarly slow in œsophageal involvement and frequently limited to one wall for a long period of time. Metastases are also slow in taking place.

Symptoms occur early as a rule, unfortunately they are belittled in most instances until extensive involvement has occurred. Probably the earliest in occurrence is the change in character of the deglutition murmur, thus, in the involvement high up the early or squirting sound may be markedly inhibited, if in the thoracic segment the second or squeezing murmur which normally occurs seven seconds after swallowing is more or less delayed, and in cardial carcinoma this sound may not

only be altered in character, but be entirely absent. These phenomena are, however, seldom noted until dysphagia, which is the cardinal symptom of the disease, has been ushered in. This symptom is invariably progressive in character, first being noticed after ingestion of solid food, later even liquids cause marked discomfort, although in many instances when ulceration and sloughing take place there may be a prolonged period of marked amelioration, or even a practical disappearance of the dysphagia. As a result of insufficient nutrition, loss of strength and increasing emaciation become progressively more marked. Anorexia, nausea, vomiting, regurgitation, cough, dysphonia, excessive thirst, and dryness of the mouth complete the general picture. Darting pains radiating to the back, shoulders and neck indicate extension into the nerve trunks. A peculiar bursting or breaking sensation is frequently complained of in some late cases and may be attributed to nerve involvement.

Diagnosis.—The subjective history and general objective findings are of the utmost importance, but pathological examination of tissue removed and ocular demonstration of the growth itself should be obtained; a certain diagnosis should be made. The location of the stricture should be ascertained and the character of the walls at this point be determined. The methods at our disposal for accomplishing this are afforded by the use of œsophagoscopy, sounding and radiography (Fig. 11), the technic of which is elsewhere described.

Treatment of carcinoma of the œsophagus may be either medicinal, mechanical, palliative, or radical. Therapeutic treatment has until lately had merely a symptomatic basis for its exhibition and consists merely of the application of opiates, cocaine, lavage with salt, borax, soda, or a one to four per cent. silver nitrate solution. For the relief of the dysphagia a combination such as the following will be found most useful, dioninæ and codeinæ hydrochloridi āā gr. iss, cocainæ hydrochloridi gr. iv, ammonii valeratis and aqua amygdalæ amaræ āā ʒii; Sig. Fifteen drops three or four times a day. Atropine

and potassium iodide have also been given. Temporary results have lately been claimed by the introduction of radium to the site of stricture, using 100 milligrammes encased in a lead and gold capsule and allowed to remain in apposition to the growth from six to eight hours at varying intervals of time, combined however with dilatation of the stricture. The injection of various substances which are claimed to have a particular affinity for cancer cells and which destroy them have as yet not been perfected to a degree that warrants their recitation.

Mechanical treatment consists of dilatation of the stricture by one of the methods previously described. Probably the most efficacious and certainly the safest procedure is that of employing the string guide method of Plummer with the fenestrated olive bougie. Dilatation may be safely carried at the first sitting to a No. 35 or 40 F. Cutting through the protruding growth by the Abbe string method and subsequent dilation has also given good results. A marked relief from the dysphagia is thus frequently afforded and moderate comfort obtained for many months or even longer periods.

Palliative treatment, should emaciation occur very rapidly or the general condition of the patient be so poor that instrumentation is contraindicated, or conditions be such that a short prolongation of life is desired, should consist of a simple gastrostomy. The results obtained from such operative intervention are questionable and as a rule unsatisfactory.

Radical operative interference in cases of carcinoma of the œsophagus, especially in involvement of the cardiac portion, has made extraordinary progress since the introduction of the differential pressure cabinet, introduced by Sauerbruch, and the method of intratracheal insufflation anæsthesia, as elaborated by Meltzer. Operations which have been performed successfully consist, according to the location of the tumor, of cervical resection, resection of the thoracic segment through a posterior thoracic mediastinotomy, and resection of the cardiac segment with a subsequent œsophago-gastroanastomosis, or a dislocation of the jejunum under the skin of the thorax, or by resec-

tion of the greater curvature of the stomach and a dislocation of it under the skin of the thorax

DIVERTICULA OF THE ŒSOPHAGUS.—Several classes of this condition are recognized and may be considered either from their etiologic or from their anatomic and clinical aspect. The former group is therefore divided into (1) traction, (2) pressure or pulsion, and (3) traction-pressure diverticula, according to the processes involved in their formation. The second class comprises four subdivisions which are self-explanatory (1) pharyngeal, (2) pharyngoœsophageal, (3) mid-thoracic, and (4) infrabifurcal diverticula or those situated below the level of the bifurcation of the trachea. This type is particularly infrequent in occurrence, while the pharyngoœsophageal type is the most common.

Symptoms are those of a gradually increasing stenosis, interference with swallowing being slight at first, merely a sense of obstruction being complained of. This is followed by irregular regurgitation of undigested and non-acid material. The progressive stenosis is entirely dependent upon the increase in size of the sac which causes pressure upon and subsequent occlusion of the œsophagus. Pain after eating is frequently complained of, due to distention of the sac and pressure exerted on the adjacent structures by it. Immediate relief is afforded by regurgitation of the contents. Progressive emaciation and death from inanition ensue if the condition is not recognized and relieved.

Diagnosis is, as a rule, relatively simple. In the most frequent type of pharyngoœsophageal diverticula the tumor usually lies on the left side of the neck and is frequently mistaken for the enlarged left lobe of the thyroid. Pressure upon it causes its contents to well up in the mouth and this affords the examiner a pathognomonic phenomenon. Dysphonia, dyspnoea, and even asphyxia may occur, while many complain of an irritative cough. A radiograph after administering a bismuth meal shows with great definiteness not only the presence but the situation, size, and direction of the diverticulum. (Figs. 12, 13, 14 and 15.)

Diagnosis of the more deeply situated dilatations is more difficult but of extreme importance, particularly its differentiation from dilatation resultant to cardiospasm. The most exact evidence may be obtained here also by the use of the radiograph. Of confirmatory nature the use of Strauss's volume measure, or Rumpel's double sound and œsophagoscopy may be employed, and of particular value the use of the Plummer string guide method of sounding. The information thus obtainable is well shown in Figs. 16 and 17. This will be found of particular advantage in greatly emaciated cases in whom an operation in such an enfeebled condition would be dangerous, as a stomach tube may be threaded over the string guide and food thus given without the necessity of a preliminary gastrostomy.

Treatment may be palliative or radical, the former consisting of sounding which has given moderate relief in a few instances, and symptomatic measures, as suitable diet, position, and irrigation of the diverticulum which have held the condition in check for many years in some cases.

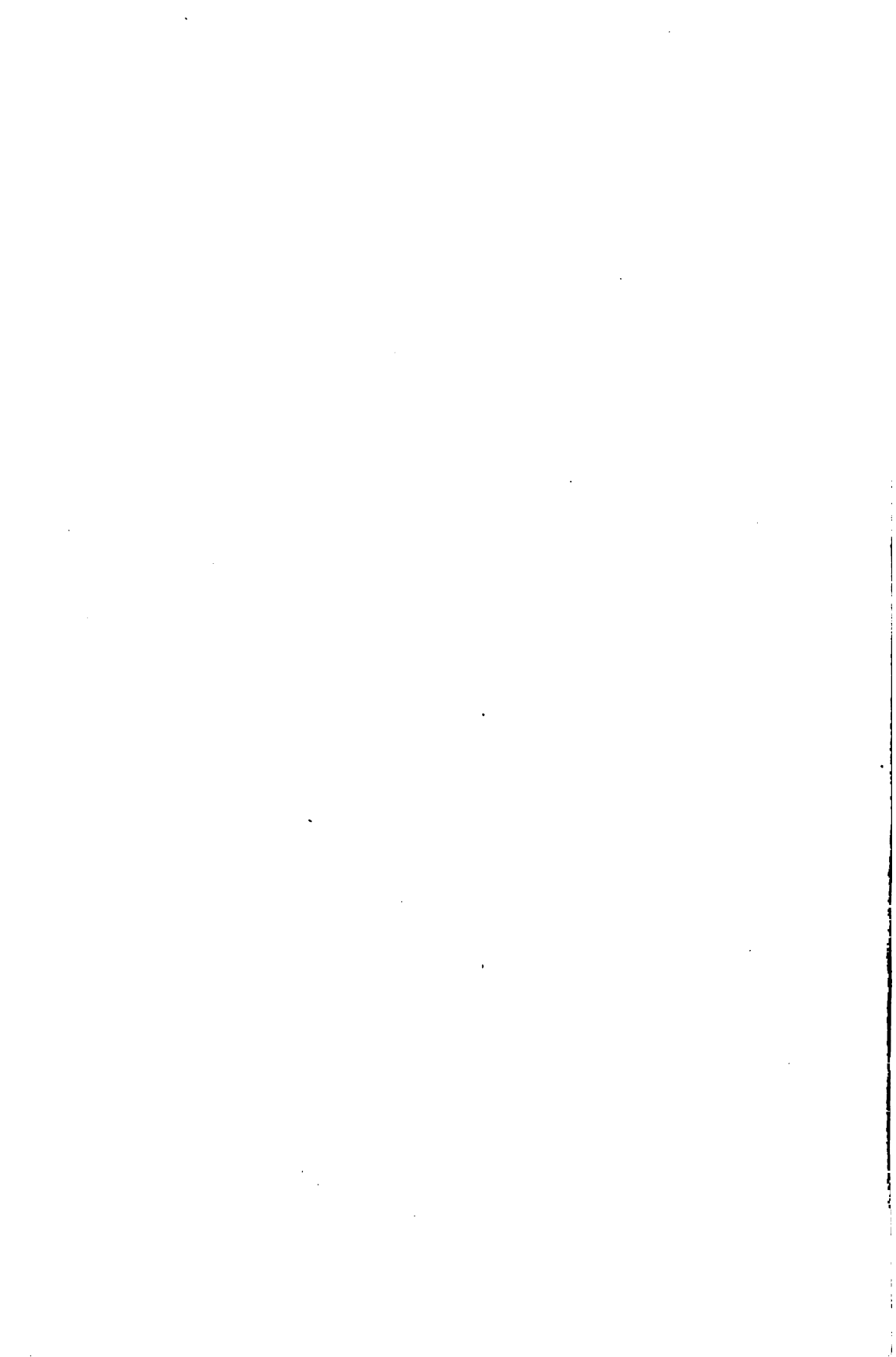
Operative Method.—Incision along the inner margin of the left sternomastoid muscle which is drawn outward, while the anterior sternal neck muscles are tracted inward. The lobe of the thyroid is elevated and the lateral thyroid vein ligated and cut; care must be exercised to avoid the recurrent laryngeal nerve. Should difficulty arise owing to the inability to recognize the sac, an urethral sound may be introduced through the mouth into the pharynx and its tip used to elevate the sac into the wound. The sac is opened and its interior examined. It is then amputated and the edges of the wound in the œsophageal wall inverted by a continuous mattress suture, a reinforcing Cushing parallel suture of fine gut is then applied. A temporary rubber tissue drain should be inserted. It is wise to empty the sac before the anæsthesia is begun. The after-treatment consists of enteroclysis (Murphy) and feeding twice daily by means of a small stomach tube. Infrequent sips of hot water may be allowed on the second day. Mayo

reports six operative cures, no mortalities and but two fistulæ by this method. The writer has found the use of a duodenal feeding tube ideal for the conveyance of liquid nourishment by any lesion of the oesophagus or stomach, and its use will be found particularly applicable after the above operation.

In cases of small diverticula the method of Girard of inverting the diverticulum and allowing it to atrophy may be employed. Danger of stenosis in larger dilatations precludes this procedure.

APPENDIX B.

**ENTERIC FEEDING (DUODENAL ALIMENTATION):
ITS PRACTICABILITY AND INDICATIONS.**



ENTERIC FEEDING (DUODENAL ALIMENTATION): ITS PRACTICABILITY AND INDICATIONS.*

BY JAMES TAFT PILCHER.

It has always been a most pertinent problem for both the physician and surgeon to put a diseased organ at rest as completely as possible. This pertains to the stomach as well as any other portion of the body, and the more perfectly this can be accomplished, the more rapid and definite will be the results derived from any treatment. Hitherto this has been impossible so far as the stomach was concerned, owing to the fact that nutrition must be afforded the body, and food, no matter how bland and non-irritating, introduced into the organ, must necessarily call upon its motor and secretory powers to digest and properly propel it.

A few years ago Einhorn devised an ingenious tube which, when administered by mouth, passed through the stomach and out into the duodenum and small intestine for a varying length, but far enough to prevent regurgitation of fluids into the stomach, and thus made it possible to completely rest this organ and still carry on the function of alimentation in a very practical way. This method of treatment has been in use for some years in our clinic, it having been adapted from those who originally devised it. The apparatus itself is easy of introduction and we have found that it has been well tolerated *in situ* for two or three weeks, even by very nervous patients, without any practical discomfort. Of primary consideration and an absolute contra-indication for its use is a stenosis of the pylorus which will not allow the end of the tube to pass into the duodenum. Therefore, it is necessary to ascertain abso-

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lutely before beginning this treatment that the pylorus is patent. This may be done either through the aid of radiography, or by a preliminary introduction of a duodenal bucket on a string. Instances have been called to the speaker's attention of cases in whom a tube had been introduced without having taken these precautions, and after two weeks' treatment eventually found to have been still in the stomach. To determine when the end of the tube has reached the small intestine three practically pathognomonic tests are at one's disposal:

1. If milk be taken by mouth into the stomach and an attempt made to withdraw it by syringe through the tube and none is obtained, it is a fair presumption that the end of the tube is not in the stomach.

2. If milk be introduced through the tube and after a few minutes' interval attempts be made with the syringe to withdraw it and the original quantity is not recovered, it indicates that the tube has passed beyond the pylorus, and, owing to the fact that liquids introduced into the duodenum pass out of it immediately, one is unable to recover the injected material.

3. Injection of the tube with a bismuth emulsion and taking a radiograph of the abdomen (see radiographs of illustrative cases).

If one has satisfied himself that the tube is in the duodenum, we have found it practicable to readily introduce daily food representing at least 3000 calories and have been able for periods of two or three weeks at a time to preserve nutrition perfectly in this way. To accomplish this result we have found egg and milk, lactose and proprietary foods, which can be administered in the form of an emulsion, and other liquid substances, to be of the most value. The meals which are administered every two hours for eight feedings may consist, for instance, of a glass of milk to which one egg and some lactose have been added. This should be introduced at body temperature and very slowly. Care must be taken at the end of each feeding to introduce a syringe-ful of water in order to clear the tube of any substance which might subsequently become coagulated and block its end. Should too rapid introduction

FIG. 1.



FIG. 2.



Case I. Showing facility with which demonstration can be made that the tube is really in the duodenum, and how definite outline may be obtained of the entire course of the first part of the small intestine.

Case II. Showing that duodenal tube has really passed through the stomach into the duodenum.

FIG. 3.



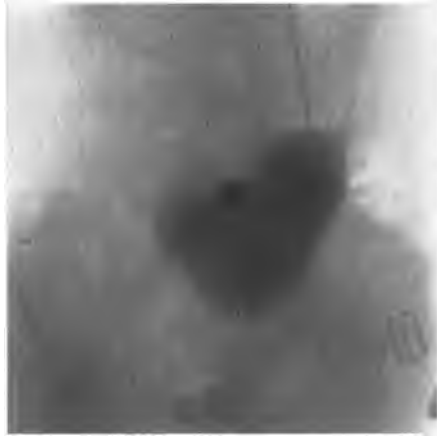
FIG. 4.



Case III. Showing tube in position.

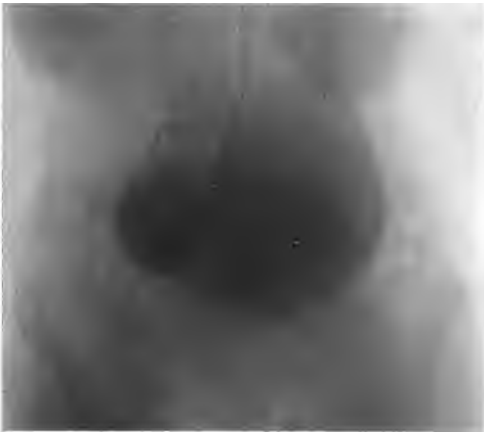
Case I. Radiograph of stomach containing barium meal with tube *in situ*. Note that the lesser curvature is below the iliac crests.

FIG. 5.



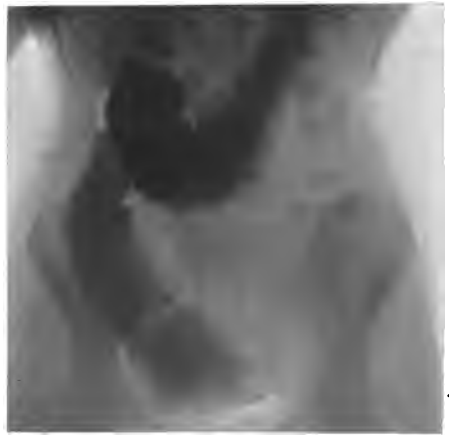
Case II. Showing the ptosis and atony of stomach before treatment.

FIG. 6.



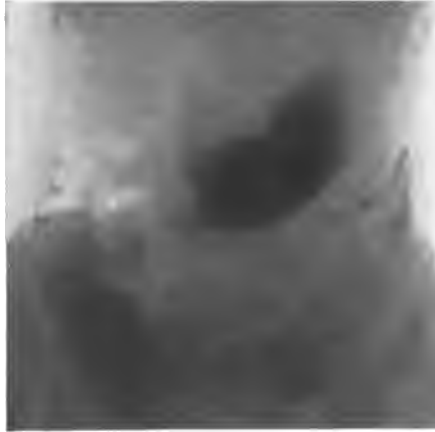
Case III. Showing extraordinary dilatation and atony with moderate ptosis.

FIG. 7.



Case I. Radiograph after ten days' treatment, showing the marked raising and contraction of stomach, the greater curvature now being on a level with the iliac crest, a rise of more than five inches, and demonstrating that the stomach is emptying normally.

FIG. 8.

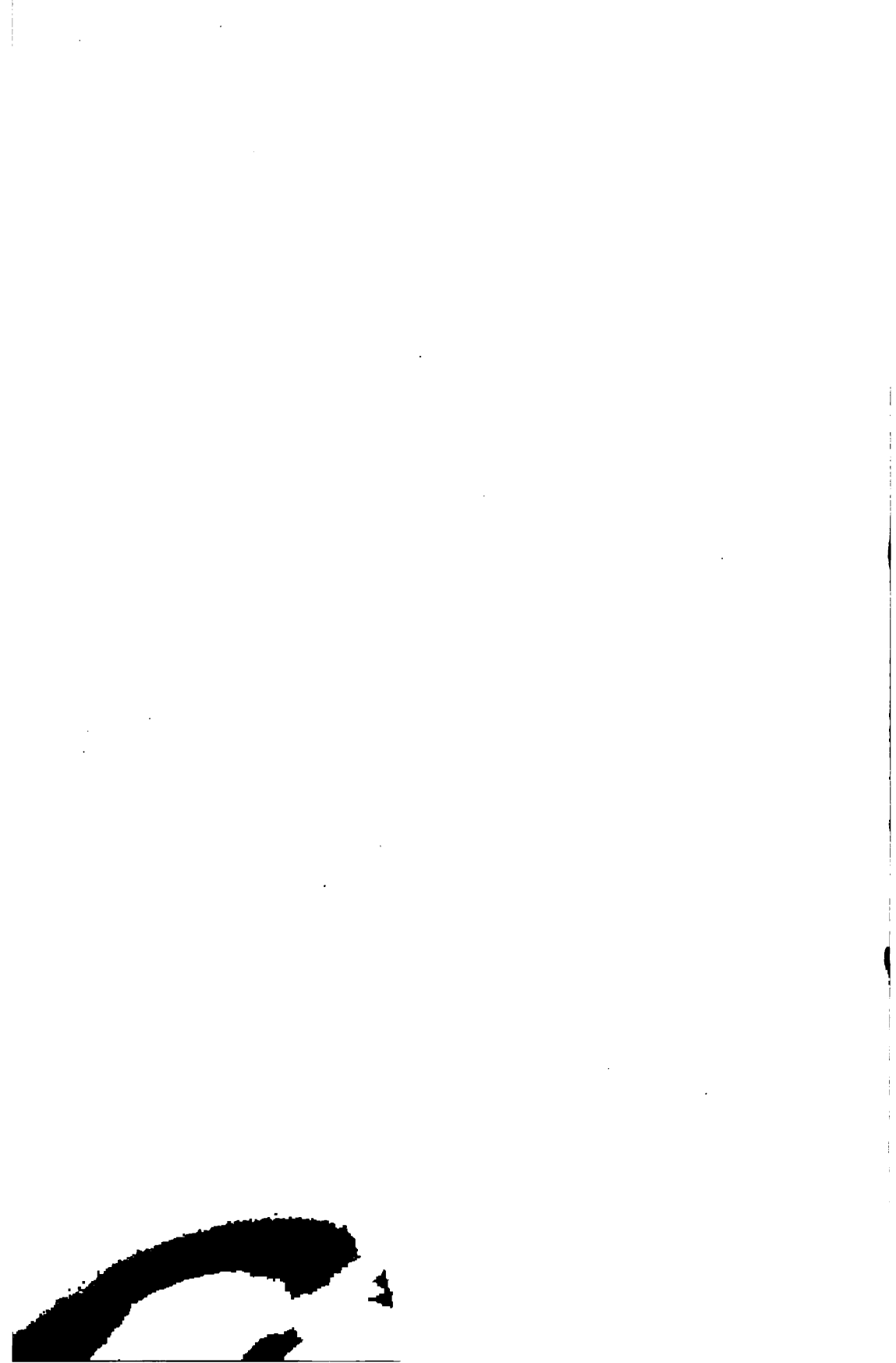


Case II. Showing a rise in the stomach's position of five or six inches and a resumption of its normal evacuating power.

FIG. 9.



Case III. Showing degree of contraction and elevation of organ, and the resumption of function.



by the syringe be attempted the patient immediately complains of epigastric distress, a feeling of bloating and marked prostration, sweating, rapid shallow breathing, increased pulse and even syncope. Each feeding should take, when administered by the syringe, about 25 minutes. A great deal of the tedium of this form of alimentation has been obviated by the author by the employment of a special apparatus so that the feeding may be administered under the same principles as those governing the administration of the Murphy drip by the rectum, between 150 and 175 drops being allowed to flow into the duodenum each minute. This has proved most satisfactory to both the patient and the nurse. During such treatment the patient need not necessarily be confined to bed, although in the beginning it is desirable. The technical difficulties which may arise necessitate the attendance in the beginning of a nurse and should be undertaken only in an institution where emergencies may be properly dealt with. It is necessary to give the patients their usual quota of water and this is introduced between the feedings in quantities of eight ounces at a time.

It has been found desirable in many instances to wash out the stomach from time to time to rid it of the ordinary secretions and detritus which may have gathered there. This has been practised repeatedly, introducing an ordinary stomach tube alongside of the duodenal tube without disturbing the latter in any way. Local medication of the stomach may thus be practised, and the administration by mouth of alkalies, bismuth or tonic astringents without the admixture of fluid or stomach secretion is thus made possible.

While the speaker does not wish to be understood as advising this form of treatment in cases of intractable ulcer of the stomach in whom the usual ambulatory measures of dietetic and medicinal regulation have proved ineffectual in relieving the symptoms, still there are many instances where there is no stenosis present and who seem so absolutely opposed to operative interference, that it would appear reasonable to offer them this method with the hope that possibly healing might occur that would not otherwise take place if the ordinary dietetic

measures were persevered in. Certainly many such cases have been completely, immediately and seemingly permanently relieved of their discomfort, pain, burning, belching and vomiting. The frequent occurrence of severe cases of hyperemesis gravidarum offers also an indication for enteric feeding and many trying experiences of this type can thus be tided over the critical period and many children saved who would otherwise most certainly have been sacrificed.

Lavage of the small intestine is indicated in many instances, such as in conditions of catarrhal enteritis or toxic albuminuria and those frequent occurrences of fermentation and putrefaction of material in the small intestine. This may be accomplished very simply and positively by introducing saline solutions or other fluids through this tube directly into the part affected. We have found that the best results are obtained in these cases from using a litre at a time continuously administered by the drop method.

Again, in cases of amoebic dysentery, where the stomach has proven incapable of retaining the ipecac administered, it may be given through the tube directly into the intestine, as, indeed, may any drug, with most satisfactory results, the intestine seeming to be practically insensitive except to mechanical or thermal factors, as in injecting material too rapidly or of introducing it too hot or too cold.

Lately this avenue of administering curative agents has been utilized for the insufflation of nascent oxygen, slowly, in quantities up to two or four litres at a time, and thus exerting a deleterious influence over excessive bacterial flora by inhibiting their growth, and indirectly but positively diminishing the so-called "fermentative dyspepsia" which they cause.

The results of cirrhosis of the liver are very rapidly and markedly influenced by enteric feeding owing to the consequent reduction in the volume of the venous flow to the portal system occasioned by the inactivity of the stomach. It would seem, however, that this improvement must only be temporary, although positive, and that a resumption of the previous condition might be anticipated as soon as the stomach was put into

use again. In the earlier cases, however, its effect might be more lasting.

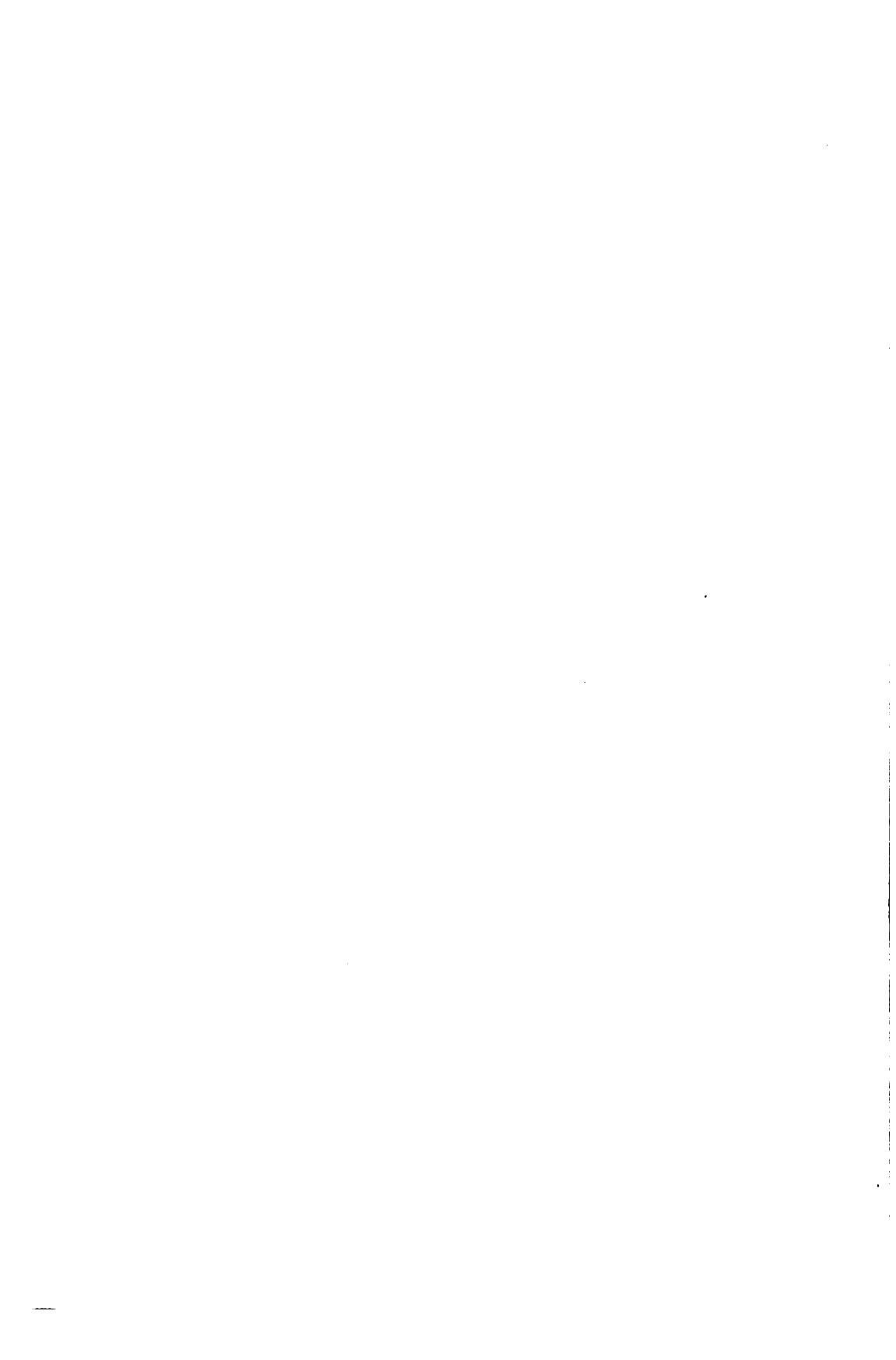
Of particular interest to the speaker is a class of cases which the general practitioner is having most frequently thrust back upon him, usually with the recommendation that lavage and abdominal support be employed, both exerting probably a temporary psychic effect, but both of which in the end prove unavailing in many of the cases. They are those of atonic or dilated stomachs which have no organic obstruction as an etiological factor, and again those instances of neurosis with epigastric distress and intermittent vomiting, considered at times possibly under the term migraine, accompanied frequently with extraordinary gas formation and belching, whether through actual gastric fermentation or acquired by process of aërophagia is immaterial.

The results of enteric feeding in many of the most intractable of these patients, particularly those of the last group, is remarkable, since previous to the treatment even the smallest amount of food ingested caused the most astonishing discomfort, while subsequent to the removal of the tube they have been able to take the greatest variety of foods without any discomfort whatever, a condition which has persisted in many of them. Occasionally a second treatment, or even a third, after an interval of several months is advisable and readily accepted by the patient who appreciates the benefits which are to be subsequently derived.

In the cases of atony and dilatation the influence of complete rest of the stomach which is thus afforded certainly does allow the organ to regain its tone in a large measure, and unquestionably gives one immediately results which cannot be obtained in many months by the use of the popular abdominal belt (see radiographs of illustrative cases).

APPENDIX C.

**SURGICAL TREATMENT OF CHRONIC INTESTINAL
STASIS.**



SURGICAL TREATMENT OF CHRONIC INTESTINAL STASIS.*

BY LEWIS STEPHEN PILCHER.

INTESTINAL stasis is a relative term. In its highest degree it requires a complete obstruction of the bowels, or a complete arrest of the peristalsis of the bowel wall to produce it. A lessened peristaltic activity is a normal characteristic of the large bowel. A greater part of the changes in the ingesta required for fitting it for absorption and body nutrition have been accomplished before the large intestine is reached, and so large an amount of absorption has been effected that the elimination of the whole of the large bowel from further contact with the nutritive mass lessens little, if any, the adequateness of nutrition. The function of the large bowel seems to be one of convenience rather than necessity. It is a receiving station, a temporary retention depot, where the residue of the ingested mass, plus the fluids and excretions added to it from the glands of the intestinal tube above, may be retained and finally concocted until it shall be in a physical state most suitable and proper for voiding, and a time for such voiding convenient for the individual may have been secured. The conditions presented by the more slowly moving fecal mass are favorable for bacterial development and the formation of the complex and multiplied products of their life processes. Our present more specific knowledge of the bacterial and chemical changes going on in materials accumulating in the intestinal canal beyond the ileocæcal valve quite justifies the conviction that has always been entertained by intelligent men, that the undue retention of this offensive material within the sphincteric gateways of the body is undesirable and dangerous. Such undue retention, habitual and persistent, I understand to constitute *chronic*

* Read before the Medical Society of the County of Kings, October, 1914.

intestinal stasis. The results of such stasis have been fully discussed by many writers. We recognize the ordinary systemic reaction in the mental depression and general malaise, the headaches and loss of appetite, and the sluggishness of the peripheral capillary circulation. We have learned that many cases which have masqueraded under the names of neurasthenia, hysteria, gastralgia, etc., are really due to a self-poisoning from retained intestinal contents. We appreciate that there is some force in the claim that it may have a direct and leading influence in the development of such secondary conditions as tuberculosis, cancer, epilepsy and chronic arthritis. We appreciate that it is frequently accompanied by chronic inflammatory conditions of the appendix, the gall-bladder and the kidneys, and that closely related to it are ulcers of the duodenum and the stomach.

We have therefore to do with an important and far-reaching pathological state for the control and relief of which the resources both of internal medicine and operative surgical effort may be called upon.

There are certain definite anatomic conditions that seem to have been originally devised for impeding the rapidity of the movements of the fecal mass after its entrance into the cæcum. These are the hepatic and the splenic flexures and the convolutions of the sigmoid. Anything which exaggerates the obstacles which these normally present to the onflow of the colonic contents is a potential cause of fecal stasis and all its train of ills. By reason of the rather firm attachments to the parietes of the two flexures of the colon, these are comparatively fixed points for the bowel. The movable portion of the colon between these two points is swung from the greater curvature of the stomach by the mesocolic omentum. A ptosis of the stomach means also a ptosis of the transverse colon; a ptosis of the transverse colon means an accentuation of the angles at these flexures and more particularly of the splenic angle. It is not so much because the colon is down in the pelvis that the stasis occurs, but because the greater acuteness and fixity of the splenic angle that is produced by the descent of the colon prevents the proximal portion of the colon from readily emptying

itself. In the milder degrees of stasis drugs that excite more powerful peristalsis may furnish the necessary *vis a tergo* to propel the contents of the colon over the obstacle; or a properly planned and applied abdominal binder may hold up the stomach, and take the obstacle out of the way. When, however, cathartics and binders fail or become intolerable, the indication for surgical operative intervention is plain. The condition of gastrocoloptosis we have learned to appreciate as the real underlying cause of many cases of intestinal stasis and of the train of symptoms that such stasis produces.

There are two methods that are being tried out for its relief: (a) The gastropexy of Rovsing; (b) the gastrocolic plication and parietal fixation of Coffey (omentocolopexy).

In the method of gastropexy the stomach is replaced in the epigastrium and fixed there by a series of sutures which are inserted into its anterior wall and brought out through that part of the anterior abdominal parietes with which the stomach is in contact. Firm adhesions form which keep the stomach in position.

Myself, I have not yet resorted to this procedure, but Rovsing reports some 500 cases in which it has been done by himself and others, in which the demonstration is clear that it is feasible and efficient, and free from objectionable sequelæ. The fixation of the stomach to the anterior parietes does not seem to interfere with its functions, and the results of the ptosis, both immediate and remote, we can readily believe to be permanently overcome. Hepatopexy and plication of the round ligament of the liver may be added if the liver is prolapsed. The narrowness of the subdiaphragmatic space—the epigastric dome—which is an accompaniment of many of these cases of gastroptosis, may be alleviated by a plastic upon the recti muscles and their sheaths, which widens the anterior wall of the epigastrium.

In the omentocolopexy of Coffey the gastrocolic omentum is gathered into transverse folds by a series of sutures which are inserted into this membrane. These sutures, from six to eight in number, pass from the greater curvature of the stomach

to the upper border of the transverse colon. Each suture in turn, beginning on either side of the median incision which exposes the parts, is made to catch the peritoneal surface of the anterior parietes and tied, so that when all are tied there is a row of stitches extending across the front of the abdomen on its peritoneal side, which fastens the plicated gastrocolic omentum to the anterior parietes. Above it lies the stomach well supported in its normal position; below it swings the transverse colon lifted up and held in the best position to transmit its contents around the splenic angle. This procedure I have resorted to in a number of instances and I have found it very satisfactory in its immediate results and, thus far, permanent in its control of the ptosis.

Thus far I have said nothing of the relation of pericolic films and bands to chronic intestinal stasis. Ptosis may or may not be complicated by their presence. If they are present, they form an imperative indication of their own for surgical interference. Their presence should be sought for as the first step in an abdominal exploration, and if found present in a degree and position to interfere with the normal transmission of the intestinal contents, they should be removed or divided until the bowel is evidently no longer restricted by them. I would emphasize the fact that I am speaking only of *such films and bands as may be present in a degree and position to interfere with the normal transmission of the intestinal contents!* Questions of etiology are entirely academic from the present point of view. It is only as elements contributing to chronic intestinal stasis that I speak of them here. As such they are extremely common and very important. I have fully discussed them in other published papers. The effect of such bands on the left side, confining and angulating some part of the sigmoid flexure, has also been the subject of important papers by Delatour.

Chronic inflammatory conditions in and about the cæcum are of importance in that they interfere with the muscular contractility of that part of the colon; stagnation of the cæcal contents is favored; dilatation of the intestine between the ileo-cæcal valve and the hepatic flexure is produced; conditions

favorable for the transmission of a low grade infection through the intestinal wall are created, which result in the production of pericolic adhesions and bands that still further cripple the colonic peristalsis and aggravate the already present tendency to stasis of the intestinal contents. The relation of nephritic and perinephritic infection, of gall-bladder infection, and of duodenal and gastric ulcer development to this cæcal condition has become well understood and fully demonstrated, and needs but a mention here.

A chronically inflamed appendix is an extremely frequent attendant upon colonic stasis. Whether it is present as a primary cause or as a later result is of little importance when these cases come to the surgeon for treatment. It is then present as a complication that aggravates and perpetuates the condition of stasis and requires operative removal.

It has been seriously proposed to avoid the possibilities and disadvantages of colonic stasis by the removal *in toto* of the colon. This has been done in many instances of late years by Sir Arbuthnot Lane and his school, and, according to the reports which have been published, with great benefit to the individuals deprived of their colons. The method is certainly radical and efficient so far as colonic stasis is concerned. I have never resorted to it myself.

The proposal to sidetrack the colon by cutting off the ileum and implanting it into the sigmoid loop is a less heroic proposition than total colectomy, and commends itself with less reserve to one's surgical judgment. The conditions of colonic stasis must, however, be rare in which either of these procedures is necessary to overcome the stasis. Rather are they likely to be necessitated by the presence of serious and intractable lesions of the colon itself.

In conclusion I would dwell with some emphasis on the fact that these gross and evident anatomical conditions, which are found contributing to so many cases of chronic intestinal stasis and which can and should be removed by surgical treatment, are not in the majority of cases all that demand the atten-

tion of the practitioner in his efforts to overcome the stasis and relieve its effects.

Surgery is not a cure-all in these cases. It is a necessary element in the treatment; it removes obstacles, lessens difficulties, restores organs to those relations required for the normal performance of their functions, but there is always left a large field for hygienic, dietetic, mental and medicinal treatment whereby ultimate full restoration to good health can be secured. Surgery must not be expected alone to cure these cases, but it alone makes possible their cure.

APPENDIX D.

**CHRONIC GASTRO-INTESTINAL LESIONS WHICH
CAUSE SERIOUS INVALIDISM.**

CHRONIC GASTRO-INTESTINAL LESIONS WHICH CAUSE SERIOUS INVALIDISM.*

BY PAUL M. PILCHER.

THE most common lesions of the gastro-intestinal tract which produce chronic invalidism result from either chronic infections of the appendix and gall-bladder, or chronic stagnation of the contents of the stomach and intestine due to dislocation of these organs.

Our interest has been stimulated in this subject of late by a certain degree of success in dealing surgically with this class of cases. While it may often be that neither condition, if left uncomplicated, causes chronic invalidism, nevertheless infections of the appendix and gall-bladder usually lead to a series of other abdominal disturbances; while chronic dislocation results in retarding the end results of digestion or assimilation, interfering with the functions of the stomach and intestines, in other words producing gastro-intestinal stasis. In some cases the principal lesion is a dislocated organ. In others, in addition, we have deformities of the mesentery and abdominal organs which result in:

1. Chronic inflammation, especially of the pancreas, gall-bladder, and appendix.
2. The production of pericolic membranes which bind down various sections of the colon and hinder the onward course of the fecal mass.
3. Omental maldevelopment and irregularities.
4. Multiple and often extensive adhesions in the region of the appendix, cæcum, duodenum, pylorus, gall-bladder, and sigmoid colon.

We will omit discussion of the cases of chronic invalidism due to chronic infections etc., and consider here those due to

* Address delivered before the Academy of Medicine of Northern New Jersey, October 21, 1914.

ptosis and stasis. These form a distinct class among gastro-intestinal disturbances, but unfortunately the symptoms produced are many times misinterpreted and are often confused by added complications due to chronic inflammation of the appendix, or gall-bladder, or both.

I. THE CASES OF INTESTINAL STASIS.—There is a distinct class of chronic abdominal ailments in which the symptoms are not so generally understood and which do not point so unquestionably to the abdomen as their source. Constipation, mental apathy, sluggish circulation, headache, anorexia, frequent nausea, loss of weight, a foul taste in the mouth, myalgia especially referred to the muscles of the extremities, painful joints, etc., are general manifestations of the disturbance, and the diagnosis most frequently given is either nervous dyspepsia or advanced neurasthenia. These are the cases of partial obstruction, of fecal imprisonment, of ineffective peristalsis, of constipation.

2. THE CASES OF GASTROPTOSIS.—Gastroptosis, on the other hand, presents quite a distinct symptomatology which often may be recognized. We must remember the fact that many patients with ptosis, aside from a slight constipation, enjoy good health and often do not need medical assistance. Advanced cases of gastroptosis often present symptoms strongly resembling those due to gastric ulcer. If, however, the diagnostician bears in mind the general picture of ptosis, a differential diagnosis is usually not difficult.

There are two distinct types of gastroptosis: The *virginal*, occurring in maidens who have never borne children, and the *maternal*, occurring in mothers who have borne many children. The two types differ both in their pathology and in their symptomatology.

Symptoms.—The patient with virginal ptosis is usually a young woman (as a rule), nervous, tired, slenderly built, one whose musculature is soft and flabby. The chest frame is usually long and the rib curvatures, instead of receding from each other, descend sharply and form a sharp angle leaving a very narrow space above the umbilicus for the stomach. The

advanced cases suffer from extremely painful symptoms: *Pain* in the upper abdomen on the *left side*, cardialgia, vomiting after meals, persistent constipation, irregularities of menstruation, painful or difficult urination, and often innumerable nervous symptoms which account for those cases being so often recorded under a diagnosis of hysteria. *The pain* usually begins as soon as the food enters the stomach and differs from the pain of gastric ulcer in that with ulcer it is the quality of food, while with ptosis it is the quantity of the food which seems to control the pain. With ulcer patients, for example, cardialgia occurs after eating rich, irritating food, but not after drinking milk or gruel. With a patient suffering from gastropotosis, however, it is quite immaterial what is eaten, it is the quantity usually which makes the difference; it has often been noted in the treatment of a gastropotosis case, that rest in bed brings about improvement in the patient, for it allows the stomach to rise higher in the abdomen, while change in the character of the diet unless accompanied by rest in bed does not help the patient much. It must be remembered too that with these cases the transverse colon is usually sunken and filled with fecal material, giving all the added symptoms of intestinal stasis (Fig. 4). In the maternal cases usually there are no very severe symptoms other than the constipation and the symptoms resulting upon intestinal stasis.

Radiographic examination is of the utmost importance both as a diagnostic method and as a means of demonstrating subsequent improvement. The radiograph reveals in many instances the situation of the lesion causing the stasis and the extent of the adhesions should they be present. A knowledge of the extent of the ptosis and of the parts which are involved in the phenomena is a guide to possible future operative interference. Repeated examinations of these patients in seeking to arrive at a diagnosis is of the greatest importance.

Treatment.—In seeking to correct either of these conditions the clinician must always look for the underlying causes which produced these deformities. We recognize two potent agencies in the production of gastrocolopotosis: First, *com-*

pression of the dome of the abdomen, which so narrows this space that the contained organs are forced downward, and, second, *lack of support* below, allowing the sagging of the heavy organs when filled with food materials (Rovsing).

If we accept Glenard's theory that enteroptosis is the result primarily of some peculiar nutritive disease which results in the weakening of the ligaments, or Stiller's theory of a congenital weakness resulting in extensive loss of tone in the ligaments, we cannot logically expect surgery to be of any permanent value in the relief of these cases.

If, however, we believe that compression from above, or the lack of support from below are important factors in this disease, then we may expect help from surgery.

Our treatment of these conditions divides itself into the medicinal and mechanical on the one side and the surgical on the other.

The Non-operative Treatment.—Complete rest of the stomach muscle is greatly to be desired in the cases of the greatly dilated prolapsed organs. This can best be obtained by rest in bed, a much restricted diet, duodenal feeding (a discussion of which appears elsewhere in this Year-Book), and supporting treatment. Intestinal stasis must be overcome by drugs, massage and rest. Certain types of prolapsed organs may be replaced by mechanical means, being supported by appropriately fitted abdominal supports, not the elastic abdominal belts so commonly in use, but distinct supports constructed on the type of trusses for the control of an hernia.

If the rested stomach muscle is to retain its tone and the stomach its position, we cannot depend alone upon the abdominal truss. In addition, the patient must be taught the proper erect posture of the body, the lower thorax must be developed so that the upper abdomen may be widened, and proper breathing, proper standing and proper sitting are all most important. In addition to this, the abdominal musculature must be developed so that the recti muscles can support the intra-abdominal viscera in proper position. The exercises which will produce this result have been very well worked out

by other observers. In this preliminary report we will not go into the details of this treatment. We, however, wish to show the effect of a properly fitted abdominal truss in a case of virginal ptosis of the stomach (Fig. 1).

Many of the cases which come to us have already been treated by various means—massage, drugs, mechanical support—and when, in spite of these devices, the characteristic symptoms persist and the patient is becoming a chronic invalid, then surgery is indicated. Our observations would seem to indicate that those cases of primary gastropotosis in which chronic inflammations of the gall-bladder and appendix have developed are surgical from the start.

The cases operated upon by us have not all resulted in a cure of the patient. There has been no operative mortality immediate or remote.

During the five years of the conduct of our clinic we have operated upon many patients who presented various phases of these chronic abdominal lesions. We have been successful in relieving cases of chronic infections of the gall-bladder and appendix; the cases complicated by membranous pericolicitis; the cases of prolapse of the cæcum and transverse colon; the cases of prolapse of the kidney, liver and uterus; but we have not had universal success in the cases of prolapse of the stomach which we have operated upon.

At a later time we will report in detail all of these cases, but at present we wish to mention a few cases in point:

CASE I.—Chronic invalidism. Bedridden, due to prolapse of the liver, stomach and colon, dilated duodenum, chronic cholecystitis with gall-stones, extensive intra-abdominal adhesions, membranous pericolicitis, chronic appendicitis, intestinal stasis.

History: Woman forty years of age. Chronic abdominal distress for many years. Advanced chronic invalidism. Persistent constipation requiring combination of the strongest cathartics aided by enemata. Typical history of cholelithiasis and chronic appendicitis.

Complaint: Gradually increasing chronic invalidism; inability

to eat many foods; increasing vomiting after eating; pain in abdomen. Confined to bed for four months.

Operations.—Division of adhesions and pericolic membranes; removal of appendix; cholecystostomy with removal of gallstones; hepatopexy with suture of anterior margin of liver to under surface of diaphragm; shortening of gastrohepatic omentum by suture; Coffey operation for suspension of transverse colon and stomach.

Result: Immediate operative recovery; great increase in range of diet so that could eat practically anything; bowels moved normally as a rule, occasionally needing a cathartic to supplement same.

Remote Result.—Report, January 28, 1915, three years after operation, using as far as possible the words of the patient:

General health considerably improved since operation. Still feels need of an abdominal supporter without which would be confined to bed. Much exertion brings on accumulations of gas accompanied by pain. Is able to eat almost anything. Feels that operation has made enjoyment of life possible. Has recently had some vomiting spells and some colic. Takes a compound cascara tablet No. 3 every night. Occasionally has to supplement this by use of an enema.

Remarks.—The case is cited, not as a brilliant result, but as an example of the extreme and complicated condition which is sometimes presented and which no amount of surgery or mechanical care will entirely cure. Surgery offers the only aid in such cases, and the operator, as well as the physician, must realize that certain deformities have occurred which can never be entirely corrected.

CASE II.—Chronic invalidism from gastrocoloptosis and membranous pericolitis. Young woman twenty-three years of age who, besides chronic intestinal spells, has had attacks of *petit-mal*.

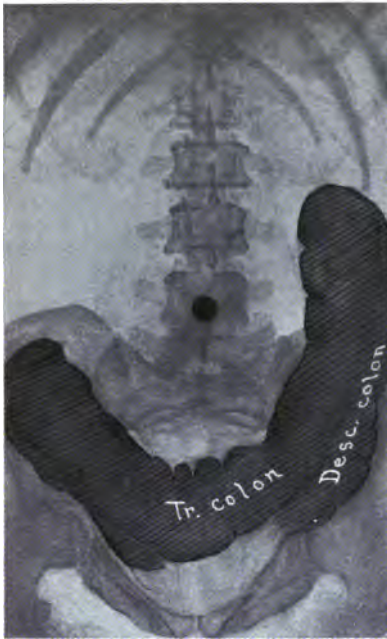
Mechanical Defects.—On standing the hepatic flexure descends into the pelvis so that the highest point of the ascending colon is about two inches below the level of the iliac crest. The greater part of the transverse colon sinks into the pelvis; adhesions between the transverse and ascending colon at splenic flexure (Fig. 2).

FIG. 1.



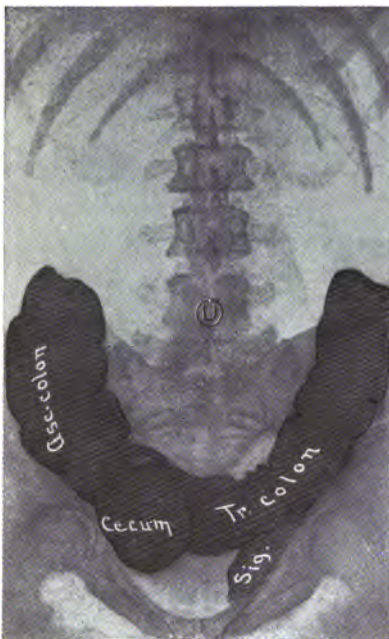
Gastroptosis. The dotted line shows the outline of the stomach with patient standing, before use of abdominal supporter. The radiograph itself shows the outline of the abdominal supporter, with the stomach supported above it, showing the effect and support obtained from the use of this type of abdominal supporter.

FIG. 2.



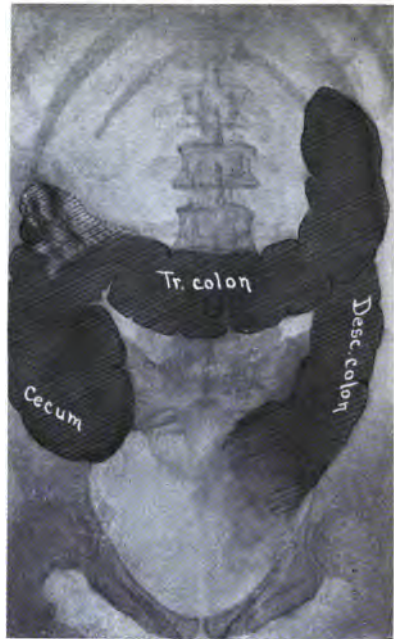
Case II. Position of cæcum and colon before operation. Patient standing.

FIG. 4.



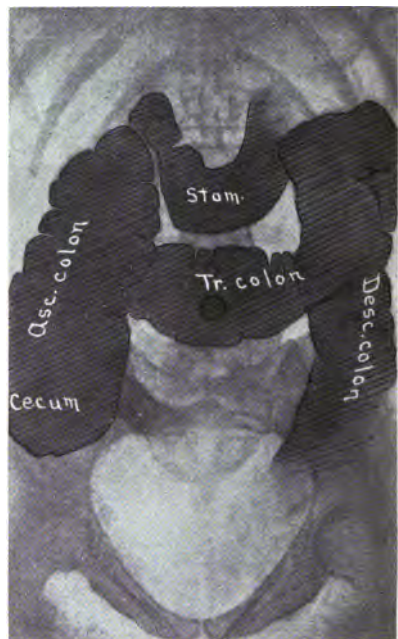
Case III. Position of cæcum and colon before operation. Patient prone.

FIG. 3.



Exact representation of radiogram showing mechanical result obtained in Case II. The cæcum and colon are in good position. After operation.

FIG. 5.



Case III. Position of cæcum, colon and stomach in same patient as Fig. 4; one year after operation. Patient prone.

FIG. 6



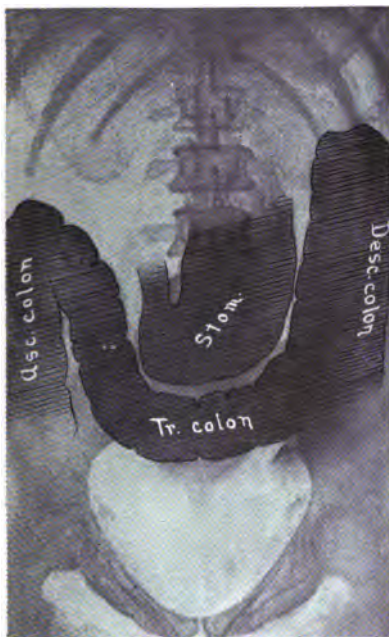
Case III. Position of cæcum, colon and stomach in same patient as Figs. 4 and 5; one year after operation. Patient standing.

FIG. 7.



Showing mechanical result of fixation of cæcum which had prolapsed into pelvis and was replaced and sutured in normal position. The transverse colon is not in good position. Patient prone.

FIG. 8.



Same patient as Fig. 7. Patient standing. Stomach somewhat prolapsed.

FIG. 9.



Same patient as Figs. 7 and 8. Radiograph shows stomach considerably prolapsed. Patient still has marked stomach symptoms.

Operations.—Appendectomy; fixation of cæcum to right parietal peritoneum; suture of gastro-colic omentum to anterior abdominal wall above umbilicus; division of membranous bands.

Result: Most satisfactory operative recovery.

Report, January 31, 1913, fourteen months after operation: General physical condition very satisfactory. Weight increased 47 pounds. Eats without discomfort. Bowels usually regular. No trouble from gas. Some burning in the epigastrium after meals.

X-ray Report (November 8, 1913).—Cæcum is in good position and not dilated, does not descend on standing. Hepatic flexure in good position and remains so on standing. Bowel has remained fixed in good position, but there is some interference with passage of fecal stream at the hepatic flexure (Fig. 3).

Practical Result.—Patient in general feels perfectly well, absolutely without pain, digesting everything perfectly. The skin has become clear, smooth and white, in place of the muddy complexion previous to operation.

January, 1915, three years after the operation: The patient's general health is good; she suffers at times from headaches and some accumulations of gas in the stomach. Her bowels never at any time, even before operation, were much constipated.

In this case we feel that we have obtained a very good mechanical and functional result, but by no means perfect.

CASE III.—*Chronic invalidism with acute dysmenorrhœa, chronic colitis, membranous pericolicitis, prolapse of stomach and colon, chronic cholecystitis, intestinal stasis, retroversion of uterus.*

History: Woman, twenty-nine years of age. History of dysmenorrhœa, intestinal attacks beginning seven years ago, acute abdominal symptoms developed four years ago, causing appendix to be removed. Never complete recovery. Intermittent attacks of colitis with ulceration and hemorrhage from the bowels. Continuously constipated with intermittent diarrhœa, vomiting and abdominal pain, autotoxæmia, low urinary output, loss of weight 31 pounds. Last attack of colitis so exhausting that dissolution was feared (Fig. 4).

Operations.—Division of membranous films and bands; suture of colon and stomach to anterior abdominal wall; Coffey's hammock operation; extirpation of fimbriated extremities of Fallopian tubes. Further operative procedures impossible on account of weakness of patient.

Immediate operative result satisfactory. Increase in strength, 12 pounds increase in weight, good appetite, much improvement in action of bowels, but not perfect.

Remote result, return of nearly all the former symptoms. Mechanical result of Coffey's operation good. Functional result unimproved (Figs. 5 and 6).

Remarks.—It was hoped to do a second series of operations, so arranging opening between the intestines that the areas of stasis should be overcome. Also, to fix the uterus in better position. She did not return, however, for this.

These three cases are cited not to show the brilliant results of surgery, but to point out some of the problems with which the surgeon is confronted in dealing with chronic invalidism due to intestinal lesions. The cases cited show a certain degree of mechanical success. These and other like cases have demonstrated to us that it is possible to fix the liver in proper position and hold it there by suture; that it is possible to fix the cæcum and ascending colon in position and hold them there. With the Coffey operation we have been only partially successful and we believe that fixation of the stomach itself (in appropriate cases to be discussed later) is necessary for complete success in cases of gastrocoloptosis.

Furthermore, in dealing with these cases, we are impressed with the fact that in many cases we have advanced anatomical lesions which have caused changes that surgery cannot entirely overcome.

We believe, further, that there are cases in which removal of portions of the large intestine is indicated. Anastomosis of the small and large intestines, anastomosis of the cæcum with the sigmoid, gastropexy according to Rovsing's method, Coffey's operation in prolapse of the transverse colon without dilatation of the stomach, and last, but not least, mechanical treatment by the employment of braces, posture and exercises may each be indicated in suitable cases.

We think it should be impressed upon patients that it may take more than one surgical effort to bring about a good functional result.

APPENDIX E.

**CHOICE BETWEEN INTERMITTENT CATHETER-
IZATION, THE CATHETER À DÉMEURE,
AND SUPRAPUBIC CYSTOSTOMY IN
URETHRAL OBSTRUCTION.**

CHOICE BETWEEN INTERMITTENT CATHETERIZATION, THE CATHETER À DÉMEURE, AND SUPRAPUBIC CYSTOSTOMY IN URETHRAL OBSTRUCTION.

BY LEWIS STEPHEN PILCHER.

THE determination of the question whether repeated catheterization at certain intervals, or the use of a urethral catheter tied in, or the suprapubic cystostomy with tube drainage therefrom shall be resorted to, will have to be determined by the peculiar conditions of the individual case. From the standpoint of the seriousness of surgical procedure they are likely to be considered in the order in which they have been mentioned.

Intermittent Catheterization.—As a temporary expedient to relieve an obstruction which may be expected to shortly disappear, intermittent catheterization is simple and efficient. It has its dangers, which consist, first, of possibilities of septic infection which, while they may be reduced to a minimum by extreme care, are nevertheless always present, and in the peculiar conditions which surround patients suffering from urethral obstruction the necessary cares are usually sooner or later imperfectly observed, and the introduction of sepsis takes place. It is a matter of occasional observation, however, that certain individuals exhibit a marked immunity to the results of such infection, so that in such cases the use of an unclean catheter is persisted in for years with the production of only a very moderate amount of septic reaction in the bladder. These cases, however, are so rare as to make more emphatic the statement that the continued use of a catheter is sure to result in a train of septic consequences of the most serious character. Therefore the statement is fully justified by experience, that the average catheter life is not more than two years, so that a patient who elects to depend upon the continued use of the catheter for urinary relief enters upon a course which

all know will progress steadily to fatal termination within that brief period.

The second danger attending the use of a catheter is the immediate profound constitutional reaction which in occasional instances has been observed to follow its use, a reaction so profound in some cases as to terminate in death within a very few hours.

The third danger attending the use of a catheter is due to the local irritation, or possible traumatism, with which its introduction is attended. As the result of this there is pain and constitutional disturbance, though of a lesser degree than has already been mentioned, which follows each attempt at the introduction of the catheter. In those conditions of obstruction due to prostatic enlargement in which the question as to catheter relief comes up for consideration, the character of the obstruction is such as frequently to insure and accentuate the pains and difficulties last indicated, attending efforts at introduction of the catheter. These difficulties may often be very greatly lessened or modified by the choice of the best model of an instrument or by skill in its introduction, but in many cases even with the highest degree of skill and the best of instruments the local irritation incident to persistent attempts at the use of a catheter becomes so great as to be a serious element in the dangers of the case.

The Catheter à demeure.—As a substitute for intermittent catheterization the permanent tying in place in the urethra of a catheter is to be considered. Its value has received the commendation of men of the highest authority. Practically, however, it is found that marked differences exist in individuals as to their ability to tolerate the presence in the urethra of the instrument. When it can be tolerated, its use is free from the special difficulties and miseries incident to the continued frequent introduction of an instrument, especially in those cases in which the introduction of an instrument is difficult. In the best of cases, however, there is a certain amount of irritation of the urethral mucosa which attends its presence in the urethra; a moderate urethritis is produced. The irritation of the deep

urethra is of special consequence in this connection, if, as seems to be well substantiated, there is any special nervous relation between this portion of the urethra and the secretory apparatus of the kidneys. One of the alarming results which attend the second group of dangers connected with the use of the catheter, already alluded to, is anuria directly dependent upon the irritation of the deep urethra, caused by the use of a catheter. This reflex effect upon the renal secretory apparatus must be kept in mind in determining the propriety of introducing or maintaining a permanent urethral catheter. This must be of special importance in those cases in which reflex renal disturbances, dependent upon urethral and bladder conditions, have already been demonstrated. It is in this last group of cases more particularly that, as a substitute for a permanent urethral catheter, the opening of the bladder above the pubis and the securing within the opening of a suitable drain to relieve the urethra entirely suggests itself.

Suprapubic cystostomy is a surgical procedure that has its own perils, and requires the most careful attention to details of technic to reduce its dangers to a minimum. It commends itself especially for choice in those cases in which a temporary relief to urinary prostatic obstruction is desired while the best general and local conditions are being secured for the later radical removal of the obstruction itself. It is free from any of the reflex effects which attend the introduction or residence of a catheter in the urethra. It has still further the advantage not only of easy and adequate urinary drainage, but also of placing at rest the urethral tract and of being the most powerful agent in overcoming any reflex influence which the irritation of that tract may previously have been producing.

APPENDIX F.

**A NOTE ON THE TREATMENT OF TUMORS
OF THE BLADDER.**

A NOTE ON THE TREATMENT OF TUMORS OF THE BLADDER.

BY PAUL M. PILCHER.

ALTHOUGH we now consider papillomata of the bladder, either single or multiple, whether benign or showing elements of malignancy, as a curable disease, a frank cancer of the bladder, the diagnosis of which is clinically possible, must be considered as almost a hopeless condition. In reviewing my own cases of resection of the bladder for extensive carcinoma, even those which involved the anterior wall alone, I have found that death or recurrence has occurred in nearly every case. In some, the resulting deformity of the bladder has been almost as bad as the original disease and little, if anything, has been gained. A statement substantially the same as this, made at our previous meeting in Boston, called forth some criticism, but since that time I have received a letter from Dr. Young, of Baltimore, in which he stated, "I think you will be interested to find that a study of my cases verifies your contentions completely." Further reviewing the literature, we have in addition the very interesting observations of E. Hurry Fenwick of London, in his monograph, "Indications for Widely Resecting the Bladder Walls in Vesical Growth," published in 1911. In the course of a discussion of carcinoma of the bladder, he says, "We all of us admit that if the malignant growth has passed through the bladder wall and glued or fixed that viscus to the surrounding area, so that we *can* detect it by bimanual examination, operative surgery is unavailing." His operative work forces him to the logical conclusion in cancer of the bladder that "the single, abruptly margined, hard epithelioma of the upper half of the bladder, early noticed and freely removed, is the only form we can expect to cure by surgery. That no form of malignant growth, wherever situated in the bladder, is amenable to resection,

bladder perfectly well with no recurrence. Report after two years, patient entirely well.

CASE III.—*Extensive carcinoma of the bladder.*

Operation (March 20, 1912).—Intraperitoneal cystotomy, freely exposing interior of the bladder. Removal of growth by curette, destruction of the base involving the left antero-lateral wall down to the left ureter opening and the urethra, covering an area about 3 inches in length destroyed by actual cautery. Bladder reconstructed and drained. Good recovery. One year later cystoscope showed recurrence with an area near the left ureter opening, which was much displaced.

Second Operation (March 13, 1913).—Under ether. Recurrent growth about the size of a marble destroyed by bipolar spark through the cystoscope.

Third Operation.—One week later under ether anæsthesia. Same area again exposed to bipolar spark.

Examination one year later, February 14, 1914, patient perfectly well, weight 193 pounds, a gain of about 15 to 20 pounds in the last year. Cystoscopy, bladder contained easily 6 ounces. Right ureter opening normal, left ureter opening contracted to left antero-lateral junction. No evidence of any growth within the bladder. Vaginal examination shows a very slight induration on the anterior wall of the vagina, which may be scar tissue. Urine is perfectly clear. Patient has no symptoms referable to the bladder.

CASE IV.—*Multiple malignant papillomata of the bladder.*

Operation (March 12, 1910).—Suprapubic removal of multiple growths by knife with cauterization of the base. Fourteen to eighteen months later slight recurrence noted on anterior wall of the bladder. Unsuccessful treatment by Oudin spark. Two and one-half years after primary operation, ether anæsthesia, recurrence exposed to bipolar spark with its entire disappearance. Three and one-half years after the original operation considerable irritability of the bladder. Cystoscope showed no recurrence. Bladder opened suprapubically and no recurrence found. Neck of the bladder extremely irritable. Bladder drained. Four years after operation still no recurrence, but at times considerable irritation in the bladder with cedema of the tissues.

We have presented these cases as they have formed a basis which has encouraged us in using the cautery and spark in preference to resection. They are not presented as cured cases, but are simply statements of facts of the conditions presented at various periods after the treatment of extensive malignant diseases of the bladder. During the past year we have treated a number of cases and there has been no immediate mortality, but the cases are of too recent date to report.

APPENDIX G.

**TRANSVESICAL PROSTATECTOMY IN
TWO STAGES.**

TRANSVESICAL PROSTATECTOMY IN TWO STAGES.

BY PAUL MONROE PILCHER.

I. THE PATHOLOGY OF CHRONIC PROSTATIC OBSTRUCTION. II. CONDITION INFLUENCING THE CHOICE OF TREATMENT-METHODS. III. THE THREE PHASES OF INTERRELATION BETWEEN OBSTRUCTION AT THE VESICAL OUTLET AND RENAL FUNCTION. IV. THE INDICATIONS FOR AND THE TECHNIC OF SUPRAPUBIC CYSTOSTOMY. V. TECHNIC OF TRANSVESICAL PROSTATECTOMY.

INTRODUCTION.

SINCE we have adopted the transvesical operation for the relief of urinary obstruction due to changes in the prostate, we have been able more fully to study the so-called living pathology of the condition inasmuch as the vesical outlet can be studied with the prostate *in situ*, the nature of the obstructing mass determined and the resultant deformities of the bladder studied. The removal of prostates in one piece in many cases and the interurethral enucleation in others has provided us with new material for extending our observations concerning the gross pathology of the disease.

Studying this last series of cases we are led to disagree with some of the more recently advanced theories concerning the pathology of the disease. In presenting this subject, therefore, we first offer our observations on the points in question. We do not reiterate much of the work which has already been published by Dr. Lewis S. Pilcher and myself.¹

¹ Pilcher, Lewis S.: Choice of Operative Method for Removal of the Hypertrophied Prostate. *ANNALS OF SURGERY*, 1905, xli, 565.

Observations Upon the Removal of the Prostate for the Cure of Prostatic Dysuria. *New York State Journal of Medicine*, June, 1906.

Urinary Obstruction from Prostatic Hypertrophy. *Year Book of the Pilcher Hospital*, 1911, i, p. 60.

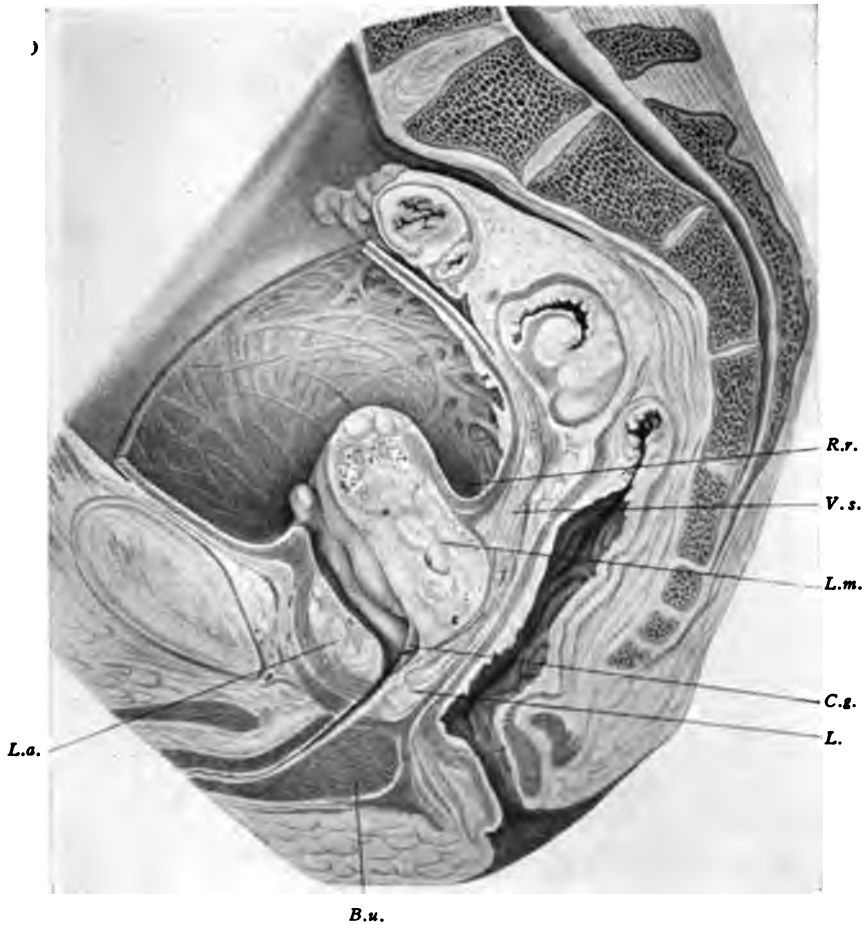
Pilcher, Paul M.: Pathology and Etiology of Obstructive Hypertrophy and Atrophy of the Prostate Gland. *ANNALS OF SURGERY*, 1905, xli, 481.

Choice of Operation for the Relief of Prostatic Dysuria and the Pre-

ring wide open. That this frequently occurs is well shown by many specimens. However, it is hard to accept the theory that in some cases, or in many cases, the enlargement of the median lobe takes place in the direction of the lateral lobes, displacing them and causing atrophy of these lobes, compressing them out into a shell-like capsule; to produce a lateral extension of an adenoma of the median lobe, the expansion must take place, not along the avenue of least resistance, but against a firm, well-developed structure. Judging from the anatomical relations as found on the operating table, Tandler's conclusions as to the part of the prostate involved in the obstruction are incorrect.

Fig. 1 is an illustration taken from the work of Tandler and Zuckerkandl, showing a sagittal section through the pelvis in a case of prostatic hypertrophy. We agree that this represents a typical case of median lobe enlargement. A number of other illustrations which are shown in the work of Tandler and Zuckerkandl are unquestionably examples of median lobe enlargement, for in each the adenomatous mass is more or less symmetrical in the median line and is forced through the sphincter dilating it. The same phenomenon has been plainly shown in many of our own specimens, for example, Figs. 2, 3, and 4. At the same time, the enlargement of the lateral lobes without the median lobe enlargement may take place, and in such cases the sphincter is greatly dilated and surrounds the hypertrophied mass. Such a case is seen in Fig. 5. In this case the lateral lobes have become enormously hypertrophied and have carried the median lobe, which is also enlarged, through the sphincter well into the bladder. It cannot be conceived that, after the enucleation which was accomplished in this case, any prostatic tissue was left behind unless it was the posterior lobe which is so nearly independent. Fig. 6, however, shows a different condition. This was a case of complete urinary obstruction, which had lasted for three years. *B', B'* are the adenomatous lateral lobes. *B* is a greatly hypertrophied median lobe. *A* is a crescent-shaped calculus, and the remaining pieces of tissue are compressed and atrophied bits of prostatic tissue which still

FIG. 1.



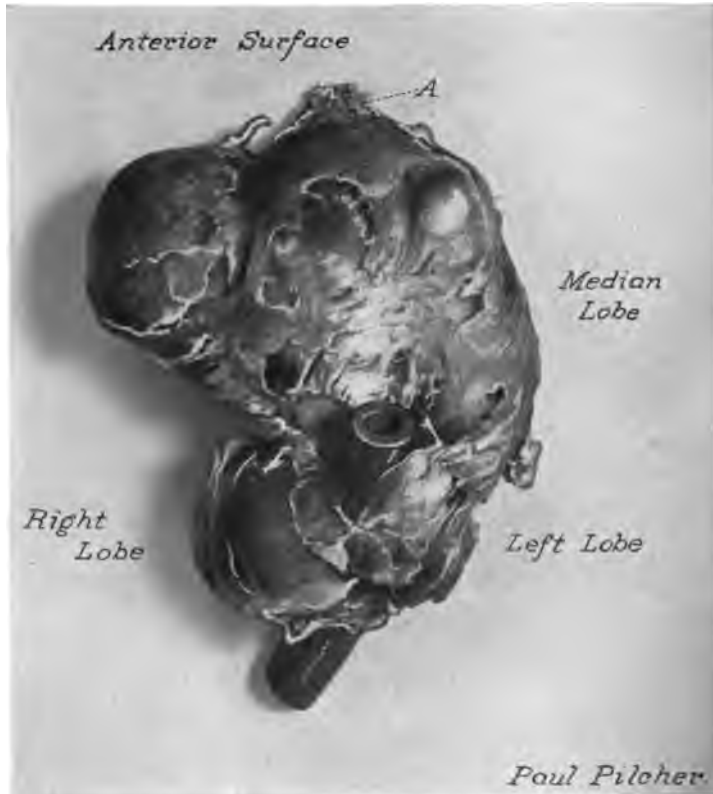
Sagittal section through the pelvis, showing the prostate hypertrophied. *B.u.*, bulbus urethralis; *C.g.*, caput gallinaginis; *L.a.*, lobus anterior; *L.m.*, lobus medius; *R.r.*, recessus retrouretericus; *V.s.*, vesicula seminalis. A short probe projects from the ejaculatory duct. (Tandler and Zuckerkandl, verlag von Dr. Werner Klinkhardt, Leipzig. Wilson and McGrath.)

FIG. 2.



Prostatic mass removed by transvesical operation, rubber tube showing direction of urethra. Beneath the rubber tube is a greatly hypertrophied middle lobe. The lateral lobes are seen forming the sides and roof of the urethra, but are not in any way obstructive.

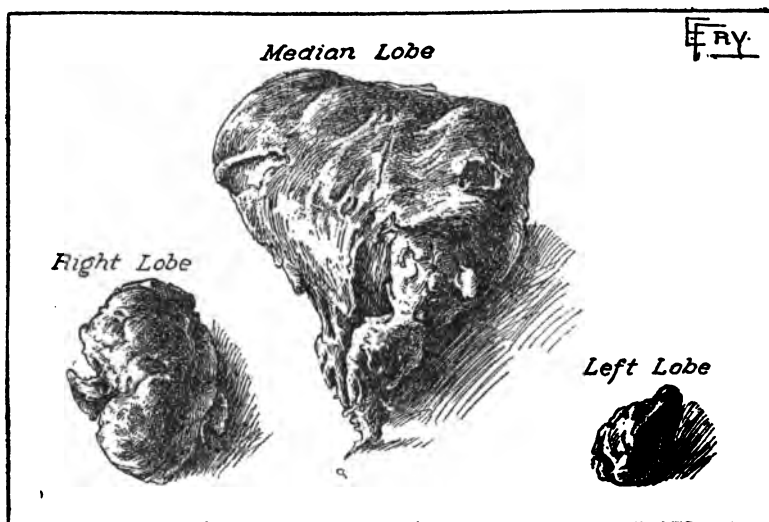
FIG. 3.



Enormous median lobe enlargement of the prostate with adenomatous changes in the lateral lobes. These lobes are smaller than normal and show no atrophy due to pressure. The specimen presents a view of the anterior face. The part above the rubber tube was entirely intravesical. The anterior face is covered by mucous membrane.

remained imbedded in the capsule of the prostate after the adenoma had been enucleated. Fig. 7 is an example of symmetrical enlargement of the median and both lateral lobes. Fig. 8 is an example of bilateral hypertrophy without any median lobe enlargement. The specimen is very distinct and convincing on this point. Fig. 9 is another example of irregular hypertrophy of the lateral lobe with very little median lobe enlargement. Fig. 10 shows a specimen removed in one piece in which the median lobe is enlarged and has pushed forward into the bladder and distorts the urethra, lifting it up and mak-

FIG. 4.



Drawing showing the three lobes of the prostate separated. Same specimen as Fig. 3.

ing it almost impossible to empty the bladder. The position of the sphincter is indicated by the arrows. Fig. 11 shows still another type of development. The lateral lobes in this case had been previously removed by perineal operation. The symptoms persisted and three years later this median lobe enlargement, with a very freely movable ball valve attachment, was taken out by a transvesical operation. No remnants of the lateral lobes could be found. It is interesting to note the position of the internal sphincter as indicated by the arrows.

In this case we had the obstruction of the enlarged mass and in addition a ball valve-action.

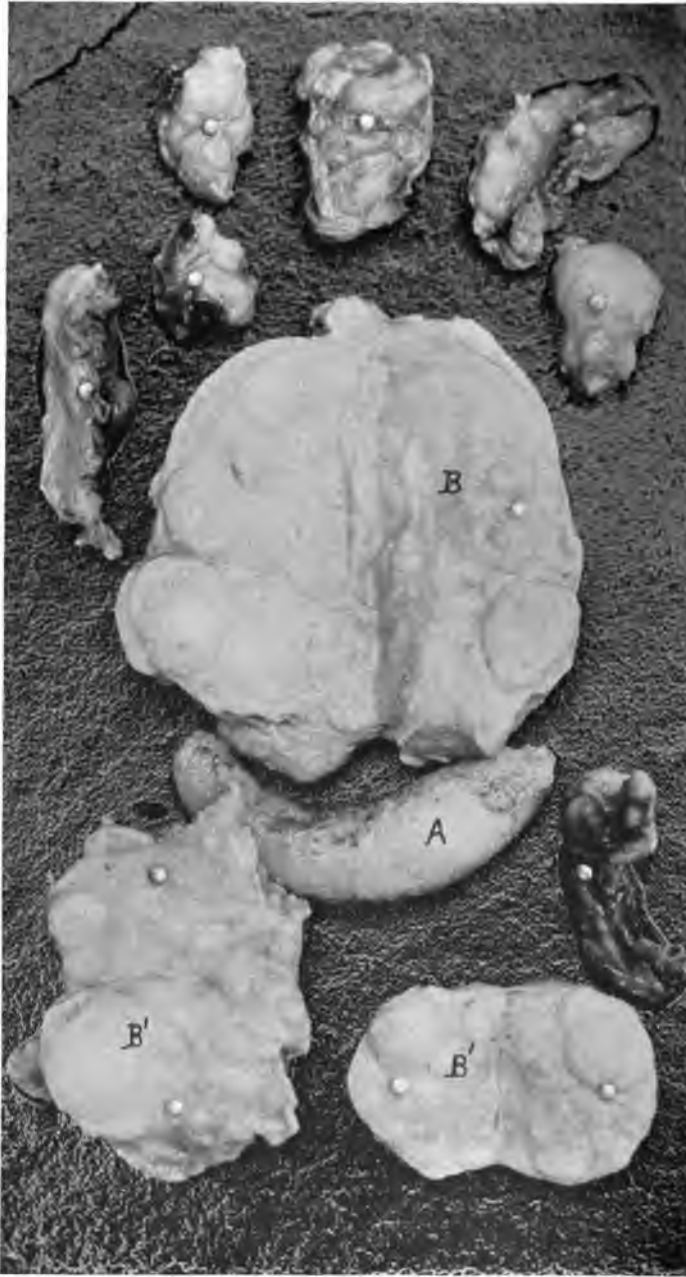
Fig. 12 is the photograph of a specimen, actual size, removed in one piece. It is a perfect example of hypertrophy of both lateral lobes of the prostate. Fig. 13 shows a section through the centre of this mass and shows quite distinctly the three lobes, the two lateral lobes and the median lobe, and their position in relation to the urethra. The median lobe extends up like a wedge between the two lateral lobes and is only moderately enlarged. In this connection reference may be made to the series of photographs of specimens which were published in 1888 by Francis S. Watson, of Boston, in his treatise on the Operative Treatment of Hypertrophy of the Prostate. Plate 4 (reproduced here as Fig. 14) shows a very important feature; the lateral lobes are moderately enlarged, the median lobe is distinctly enlarged and is projecting into the bladder, forming the cause of the obstruction. Distal to the median lobe enlargement is seen a raised-up portion, which is the colliculus or verumontanum, at which point the vasa deferentia empty into the urethra. If the finger is introduced into the urethra by the transvesical route in enucleating the prostate, one can easily see from the specimen how the colliculus may be preserved. Fig. 15 is an undeniable example of hypertrophy of both the lateral and median lobes of the prostate. This specimen, which is a dissection not only of the prostate but of the bladder as well, shows exactly the relation which no drawing could so well express. Fig. 16 shows another phase which is a bilateral hypertrophy of the prostate with a slight median lobe development causing a distinct prostatic bar. The tortuous course of the urethra, the presence of the colliculus and its relative position are clearly shown. No one could argue that in these specimens such a hypertrophy originates from the median lobe alone. The floor of the urethra is very clearly shown and is seen to be free from all hypertrophied tissue. This portion of the urethra must invariably be involved, at least that portion between the colliculus and the sphincter, in all median lobe enlargements. Fig. 17 is a perfect example of median lobe enlargement alone.

FIG. 5.



Photograph of hypertrophied prostate removed by suprapubic route. Showing bilateral and median enlargement. At vesical pole, *A*, the capsule and mucous membrane of the bladder are shown stripped back from the glandular portion of the gland. At *B* is seen the circular capsule which passes entirely around the gland.

FIG. 6.



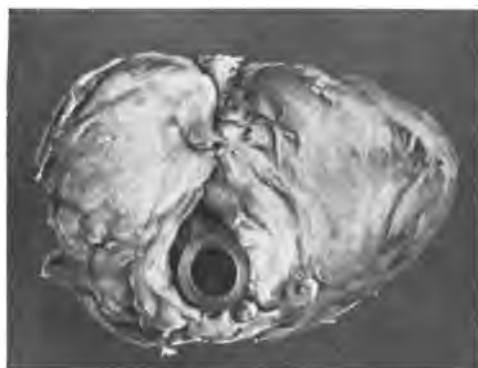
Photograph of prostatic masses removed by transvesical route. *A*, is a crescent-shaped calculus; *B*, a large median lobe; *B' B'*, the two lateral lobes. The other pieces of tissue shown in the specimen are atrophied prostatic tissue adherent to the capsule.

FIG. 7.



Specimen removed by transvesical operation showing symmetrical enlargement of both median and lateral lobes.

FIG. 8.



Specimen removed by transvesical operation showing hypertrophy of lateral lobes without involvement of median lobe.

FIG. 9.



Specimen removed by transvesical operation showing irregular hypertrophy of the lateral lobes with very little median lobe enlargement.

FIG. 10.



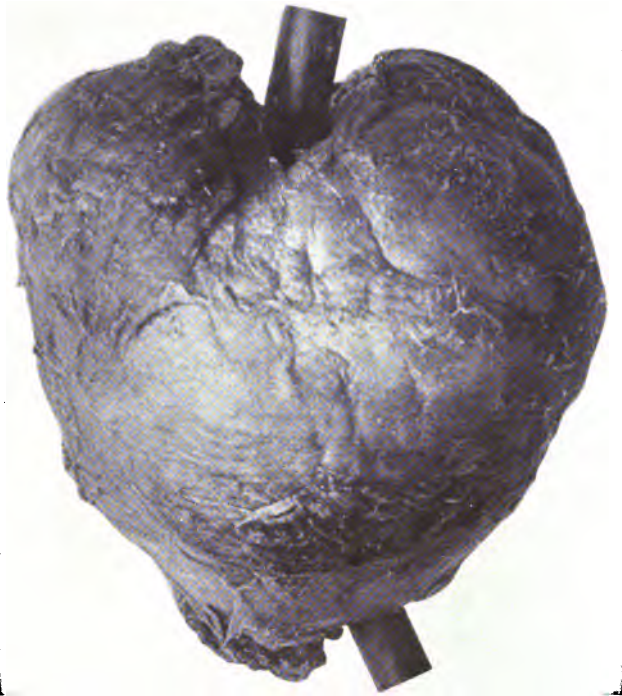
Specimen removed by transvesical operation showing marked median lobe enlargement with practically no lateral lobe enlargement.

FIG. 11.



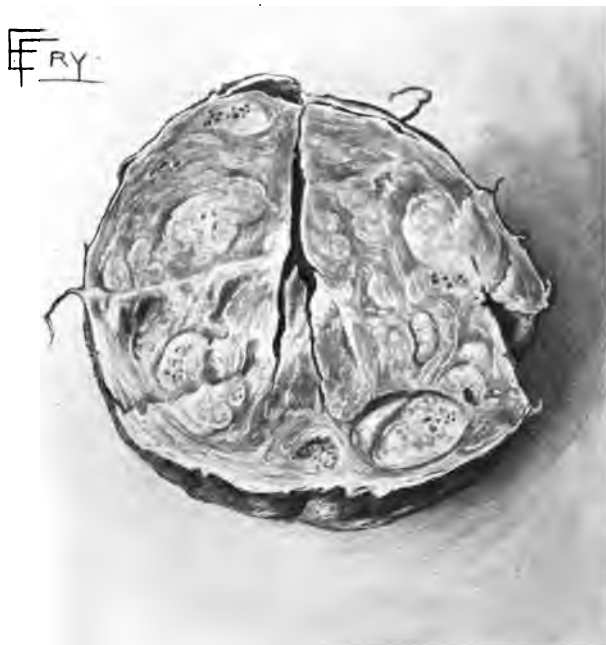
Median lobe enlargement with ball valve attachment.

FIG. 12.



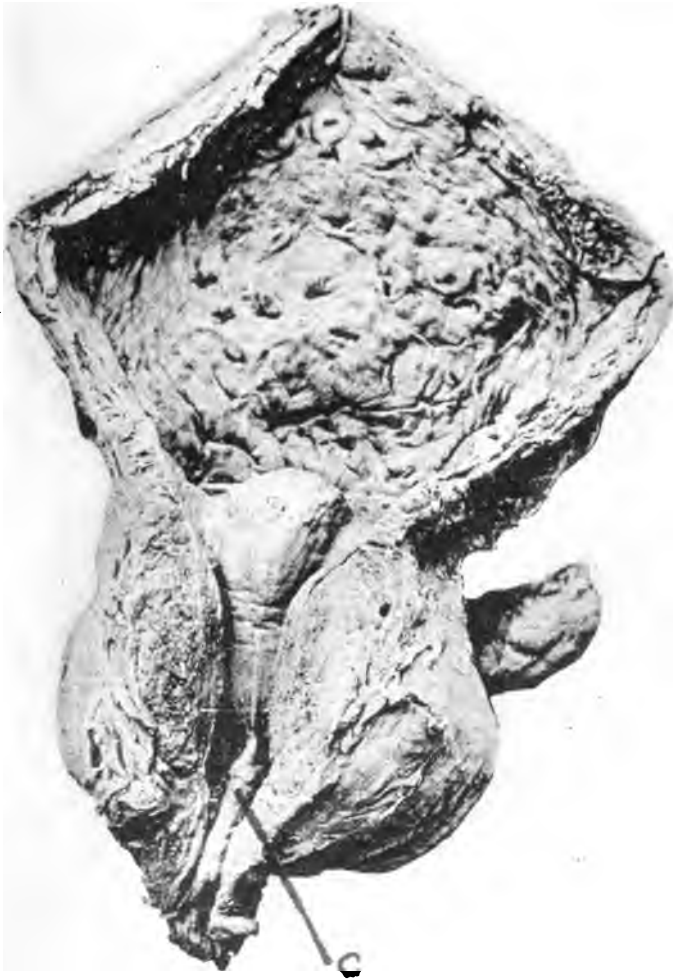
Enlargement of the prostate in which the two lateral lobes are involved. The vesical surface of the prostate appears at the top of the picture. This specimen was removed within its capsule and is a perfect example of coincident hypertrophy of both lateral lobes without any marked median lobe enlargement. The section through this mass is seen in the following figure which shows the narrow cleft occupied by the urethra. The two lateral masses and the small adenomatous median lobe are seen.

FIG. 13.



Cross section of specimen shown in Fig. 12 showing relation of median lobe and two lateral lobes to the urethra.

FIG. 14.



Bilateral and median lobe hypertrophy of prostate. Position of colliculus. This photograph shows the exact relation of the urethra, hypertrophied prostate and bladder as an example of moderate bilateral hypertrophy of the prostate, with median lobe enlarged and projecting into the bladder, the median lobe forming the chief obstruction. Following the urethra upward from the bladder, it will be seen that the urethra inclines sharply downward due to the bulging of the median lobe, which forms the floor of the urethra as far forward as the colliculus. If the finger were introduced into the urethra through the bladder, it can be easily seen from this picture how the entire prostate could be removed without injury to the colliculus. (Reproduced from Francis S. Watson's work on *The Operative Treatment of the Hypertrophied Prostate*.)

FIG. 15.



Photograph of bladder and prostate which speaks for itself. It is impossible to conceive how anyone would deny that this photograph represents a case of hypertrophy of both lateral lobes of the prostate and the median lobe. The photograph showing the distinct relation between the bladder wall and the specimen bears witness to the incorrectness of the conclusions of Tandler and Zuckerkandl when they say that such hypertrophy does not exist. (Reproduced from Francis S. Watson's work on The Operative Treatment of the Hypertrophied Prostate.)

FIG. 16.



Photograph of another specimen of obstructive hypertrophy of the prostate demonstrating another phase of hypertrophy of the lateral lobes. Position of the colliculus. In this case the two lateral lobes have developed unequally, that on the right side of the specimen being much the larger and distorting the urethra very greatly. Both lateral lobes are hypertrophied and the median lobe is represented by a thickened area which becomes a bar because of its being raised up and forced bladderward by the enlarged lateral lobes. If these hypertrophied masses originated from the median lobe, the floor of the urethra would be raised up, whereas the specimen shows the floor of the urethra only distorted in a lateral direction, while the floor is actually depressed. The position of the colliculus in this case is also well seen. (Reproduced from Francis S. Watson's work on *The Operative Treatment of the Hypertrophied Prostate*.)

FIG. 17.



Photograph of a perfect example of a median lobe enlargement without hypertrophy of the lateral lobes. (Reproduced from Francis S. Watson's work on The Operative Treatment of the Hypertrophied Prostate.)

FIG. 18.



Specimen removed by transvesical operation, showing under surface in a case of enlargement of both lateral lobes.

FIG. 19.



Same specimen as Fig. 18. The anterior commissure divided, showing two lateral hypertrophied lobes and the normal sized median lobe joining the two enlarged lobes.

In this case the lateral lobes are distinct, but not hypertrophied. The specimen shown in Fig. 18 shows well the part taken by the lateral lobes in some cases of obstructive prostatic overgrowth. The specimen was removed by the transvesical route, and the entire deformed portion of the prostate was removed in one piece. Fig. 18 shows the under surface of this prostatic mass. A rubber tube passing through the specimen indicates the position of the urethra. At the top of the specimen is seen a small collar which is the mucous membrane stripped up from the internal sphincter. This sphincter could be appreciated by a finger in the bladder. Fig. 19 is another photograph of this same specimen viewed from the anterior surface, showing, roughly, the course of the urethra, as exaggerated by the furrows produced by the presence of the rubber tube in the hardened specimen. The two lateral lobes which appear like the wings of a butterfly are joined together across the median line by a practically normal median lobe which is in no way hypertrophied. The collar of mucous membrane also appears at the top of this specimen and shows the lack of any bulging in the bladder. As far as could be appreciated by the finger, the entire prostate was removed in this case with the possible exception of the posterior lobe of the gland which was distal to the ducts, but the remains of which could not be appreciated by the finger. Examination of the cavity from which this prostate was removed, made immediately after the operation, demonstrated no tissue remaining which in any way resembled prostatic tissue. Fig. 20 is a photograph of a specimen removed the same day as the previous specimen and shows the prostatic mass as removed in one piece. The small drainage tube occupies the position of the urethra and shows it distorted and the presence of the greatly enlarged median lobe which extends into the bladder and lifts the urethra up. The bladder in this case is to the right of the specimen. As one views the specimen grossly, it would look as if the entire adenoma were one piece. When, however, the anterior commissure is divided, the specimen falls apart and forms three distinct portions; the two lateral masses, which are the lateral lobes, are greatly hyper-

trophied and compress the urethra, the course of which is indicated by the furrow (Fig. 21). To the left in the upper quadrant of the picture is seen the median lobe which extends well down into the urethra, well past the first portion of the lateral lobes, in fact, forming a wedge-shaped lobe between the portions of the lateral lobes which extend into the bladder. However, the specimen clearly shows the relations of the two lateral lobes to the urethra. Fig. 22 shows another view of this same gland which indicates more clearly the exact position of the urethra and its relations to the lateral lobes and to the median lobe. In this specimen one lateral lobe has been removed and the furrow, as indicated in the specimen, shows the relation of the urethra to both the lateral and median lobes. The lateral lobe forms the side wall for over two inches, while the median lobe, passing beneath the urethra, extends along it for an inch and a quarter.

Our own deductions are based primarily on an analytical study of our own cases, taking into account, first, the conformation of the prostatic mass as presented to the cystoscopist and judged by the eye, and the mass as found *in situ* at the time of operation and appreciated by the finger; second, a careful determination of the adenomatous mass in relation to the opening of the urethra and the sphincter vesicæ; and third, a thorough gross and sectional examination of all our specimens after removal by the transvesical route.

Professor Tandler has not demonstrated conclusively that the lateral lobes of the prostate are compressed and atrophied by enlargement of the anatomical median lobe. If he could show us the various stages of the development of this phenomenon by microscopical section, we would be convinced of his argument, but he has not presented any microscopical sections showing the transition from the adenoma involving the median lobe and atrophy of the lateral lobes. Furthermore, before we could accept his theory of the enlargement being confined only to the median lobe, it would be necessary to show that the ducts leading from this lobe were entirely distinct from the ducts leading from the lateral lobes.

II. THE CHOICE OF TREATMENT.

Assuming the diagnosis to be correct, that is, that obstructive prostatic disease exists, how shall we determine the course of treatment? And when the indication for prostatectomy is present, what is the safest procedure?

I. PALLIATIVE MEASURES.—The establishment of a catheter life, destroying an obstructing mass by using the cautery or punch, or the high frequency spark, are all but temporary expedients. Any and all of these methods may be used to insure the patient's temporary relief, but invariably the patient continues to become more enfeebled, is constantly the slave of his bladder, his mind is never at rest and finally, as a rule, he must face either an operation or death. Certainly this fact has been most forcibly demonstrated in the recent survey of our non-operated cases. These cases naturally fall into three classes, those in which the urinary obstruction is due to benign hypertrophy of the prostate, in other words, a chronic interstitial prostatitis; second, those cases in which the obstruction is due to carcinoma of the prostate; and third, tubercular hypertrophy of the prostate.

In the first class, in those cases in whom the obstruction has developed to that stage where the use of a catheter, either at intervals or every day, has become necessary to insure their comfort, infection sooner or later takes place, followed by sepsis, uræmia, etc., and the average length of life is less than three years. This is a little longer than the average time found in Squier's recently tabulated cases. All of this time, however, the patient lives in filth and misery and is a burden to himself and a trial to his friends.

In the second class of cases, the unoperated malignant growths of the prostate, no average can be stated which is of much value. The progress of cancer in the prostate is slow as a rule, but where there is much obstruction due to the growth, the combination of uræmia and the effects of the cancer often terminate the life of the patient within a year.

In the last 28 cases of benign hypertrophy of the prostate, which comprises all cases operated upon within the last two

and there is a chronic retention of a considerable amount of urine with very little overflow, the amount of urine secreted will often average as high as 120 to 150 ounces in twenty-four hours with a low specific gravity.

Where we have a contracted bladder with greatly thickened walls, in which there is only a small amount of retention, and the amount of retained urine almost entirely fills the contracted bladder, the urine is passed very frequently and in small amounts. Such a bladder may contain only two or three ounces and is almost continuously full. Under such conditions the kidney seems to diminish its secretions. The total amount secreted in twenty-four hours may be very little, finally resulting in complete anuria.

The other cases are those of acute retention of urine, in which the kidneys act freely until the bladder is filled to its capacity, at which time the kidneys stop acting entirely. It must be remembered that the bladder will never rupture from overdistention due to accumulation of urine.

Aside from the clinical evidence of renal infection and renal insufficiency already presented, the most striking evidence of renal injury due to prostatic obstruction is presented in those cases dying from the disease. Autopsy shows a variety of conditions existing in the kidney, the lesion most common to all being a hydro-ureter beginning immediately above the bladder, resulting in various degrees of hydronephrosis and destruction of the kidney parenchyma. This in turn is influenced by the degree and duration of the obstruction and in more advanced cases is accompanied by infection, the formation of renal calculi, and, in some cases, by actual infection and destruction of the kidney parenchyma.²

To the mind of the writer those lesions are brought about by two mechanical conditions: 1. The hypertrophy of the muscular walls of the bladder through which the lower end of the ureter passes and, 2, the constant presence of residual urine which helps to keep the muscles compressed and forming a

² Wade: Prostatism, Fig. 40. ANNALS OF SURGERY, March, 1914, p. 334.

chronic obstruction extending over that portion of the ureter which passes through the bladder wall. It is the exceptional case in which the infection is an ascending one, but usually, in my opinion, it is due to hematogenous and lymphatic infection of a tissue whose resistance has been greatly lowered by mechanical obstruction.

Second, objective symptoms: The cystoscope shows that many changes have taken place in the bladder. First, we note that the muscular walls are markedly changed. They are hypertrophied and trabeculated, and false and true diverticula are formed, and occasionally calculi of various sizes and shapes are seen. Occasionally, also, the infection of the renal pelvis which follows retention of urine predisposes to the formation of renal stones which may be shown on the X-ray plate.

The cystoscope, as a rule, shows the *ureter opening* raised up on a ridge with the interureteric fold quite distinct. The ureter opening in the majority of cases is normal with the exception that it is changed by the general muscular hypertrophy which surrounds it. Occasionally the ureter opening is dilated, as is seen in the accompanying illustration (Fig. 23).

Third, the operative proof: From a careful study of a series of cases in which a preliminary cystostomy was done, certain phenomena were repeatedly observed which seemed to justify us in dividing the sequelæ to advanced prostatism into three phases. It has further emphasized in our minds the peculiar balance existing between the heart, kidney, secretion of urine, and the nervous control of these in the patient who has gradually become used to over-distention of the bladder. The pathology of this condition has already been referred to.

We have learned not to rely upon any one clinical sign or symptom in judging the fitness of the patient for operation. We have learned that the balance between the various elements of the system are so adjusted that a disturbance of one element will bring to light weakness in some of the other elements which has not been suspected, for example, *the phthalein test*. This *may be very deceptive*. The patient may show 60 to 70 per cent. of excretion of phthalein in two hours before anything

has been done to relieve the retention of urine. But disturb the retained urine in the bladder and all of the other elements of the system are thrown into confusion. The back pressure is relieved; decompression of the kidney follows; swelling and congestion of the kidney takes place; and the functional capacity of the kidney immediately drops to a very low point. The outward signs of the derangement of this unbalanced kidney are very evident. This is the second phase. It is our belief that many of the cases which have died following operation are the result of a lack of appreciation of this second phase of a renal disturbance in prostatics. Many deaths have been reported on the third to the fifth day following a one-step prostatectomy, when the patient was seemingly doing well; but when we add the phenomena of the second phase to the shock of the major operation with its loss of blood and the depressing effect of the general anæsthetic, it can be easily appreciated why these deaths take place, and many will agree that the overtaxed heart and the system overloaded with toxins which the kidneys should separate from the blood are the cause of death. Our extended observations have shown us that nearly every prostatic will present these three phases, and this fact has influenced us very greatly in favor of the two-stage operation in every case of benign hypertrophy.

III. THE THREE PHASES.

The results of our observations are graphically shown on the accompanying chart, Fig. 24, which shows the average condition which prevails in many advanced cases of obstructive hypertrophy of the prostate.

The First Phase.—For the first day, the day on which the suprapubic cystostomy is done, the blood-pressure frequently registers from 200 to 220 mm. of mercury; the urinary output for 24 hours will average from 70 to 120 ounces; the phenol-sulphone-phthalein test will frequently average above 60 per cent. in two hours and the urine will show only a trace of albumin. If these conditions are considered by themselves, they will give us a false impression of the actual condition of the

FIG. 24.

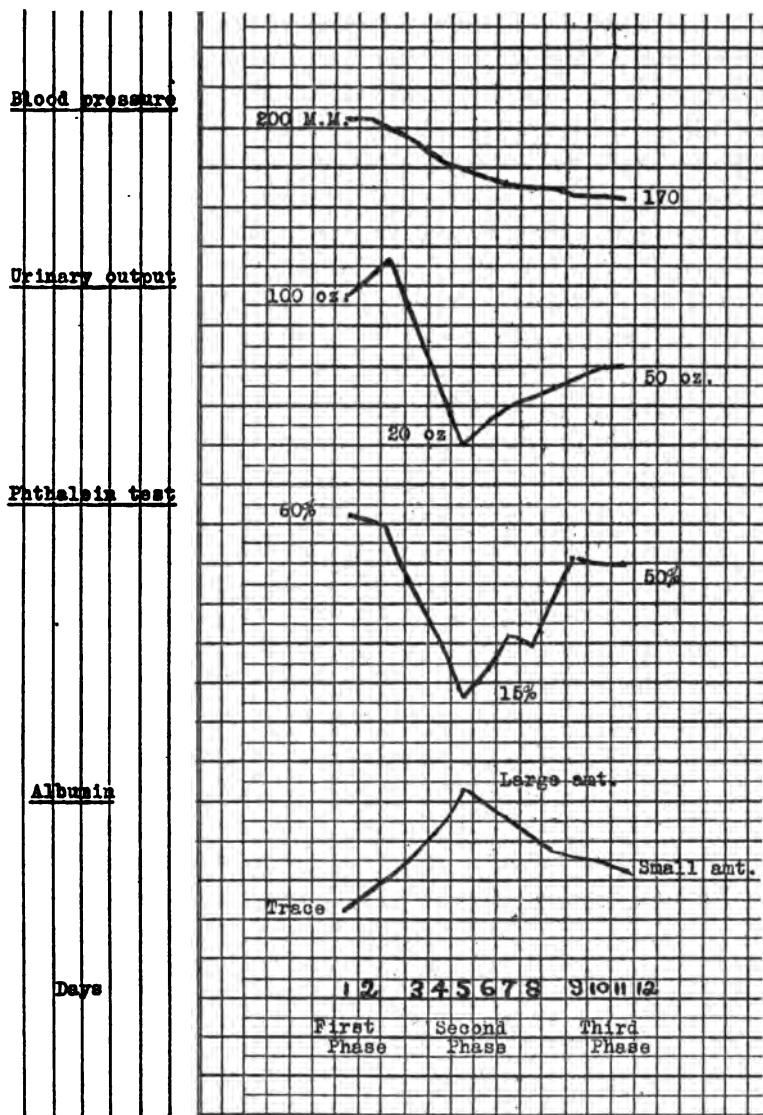


Chart showing the three phases following suprapubic cystostomy in an advanced case of obstruction due to prostatic hypertrophy.

First phase: Includes the first and second day, the suprapubic cystostomy being done on the first day. If one would observe this chart excluding the following days, the conditions would seem to be favorable for any operative encroachment. See page 514. If taken alone, this surely would seem to indicate a safe surgical risk.

Second phase: This phase extends over the third, fourth, fifth and sixth days after a suprapubic cystostomy. It shows a very marked decrease in urinary output during that time,

(Legend continued on next page.)

patient. For example, if the patient's blood-pressure registered 200, was passing 90 ounces of urine in 24 hours with low specific gravity and with only a trace of albumin, we would be rather suspicious of the functional capacity of the kidneys. But when we make a phenol-sulphone-phthalein test, and find that the output in two hours is 60 per cent. or more, it rather leads us to believe that the actual functional capacity of the kidney is greater than the specific gravity of the given specimen would lead us to believe.

The Second Phase.—A second glance at the chart will show a very different condition existing on the third or fourth day after the bladder has been opened and drained. Here we see a lowered blood-pressure, probably between 170 and 180. The urinary output has suddenly dropped to from 15 to 20 ounces in 24 hours; the amount of albumin in the urine has increased enormously and often the urine itself boils almost solid. On the third to fourth day, the phenolphthalein test shows the actual functional capacity of the kidney at this most critical time to be only 15 per cent. This, then, is the change which has taken place simply following a suprapubic drainage of the bladder without any loss of blood or other surgical shock due to anæsthesia or prolonged manipulation. Add to this, then, the shock of a prostatectomy with its general anæsthesia, a very considerable loss of blood and the shock consequent to pain, and one does not wonder that so many cases have died on the third, fourth and fifth day from no apparent cause which could be demonstrated.

The Third Phase.—Passing on then to the third phase of

a large increase in the amount of albumin present, but most important of all the drop in functional capacity of the kidney from 60 to 15 per cent.

Third phase: Showing the reaction and the recovery of the kidney after ten days. Blood-pressure 170, urinary output averaging 50, phthalein test 50 per cent., and a smaller amount of albumin present in the urine. Comparing this phase with the first phase we find a lower blood-pressure, a normal urinary secretion with an increased specific gravity, a lowered functional capacity of the kidney, as attested by the phenolphthalein test and a larger amount of albumin present in the urine than during the first phase. When, however, the reaction from this phase following enucleation of the prostate is considered, what a much better combination of circumstances exist in this phase than in the first phase. Following prostatectomy, the blood-pressure falls still lower, due to the loss of blood. The urinary output decreases most markedly during the first 24 hours, but recovers rapidly until, on the third day, it is practically normal. The phthalein test shows lessened reaction, but it never drops as low as was found in the second phase after suprapubic cystostomy, so that 50 per cent. according to the phthalein test in the third phase shows a very much greater relative functional capacity than 60 per cent. in the first phase. This we consider a point of very great importance. The amount of albumin following the operation is an unknown quantity.

the condition following drainage of the bladder, we find in the average case that on the seventh to tenth day the blood-pressure has decreased to from 160 to 170 mm., the urinary output has increased to from 40 to 50 ounces in 24 hours, the phenolphthalein test shows a reaction of the kidney from an output of 15 per cent. to an output of 50 per cent., and the amount of albumin contained in the urine has decreased very markedly, but still shows a small amount present, more than was present before the cystostomy and very much less in amount than was found on the third or fourth day.

Now if the prostatectomy is performed, the effect upon all these phenomena is quite different than was found after the preliminary cystostomy. The blood-pressure falls still lower, the urinary output decreases very little; the functional capacity of the kidney does not fall more than ten points; it is difficult to ascertain the amount of albumin present in the urine on account of the presence of the wound in the bladder, but at no time is it as great as was found on the third or fourth day after the cystostomy was performed.

By following this method we entirely avoid the second phase after the prostatectomy.

This conclusion is based upon the study of our last 28 successive cases, all of which have been operated upon after this method and all of which have recovered. It must be remembered that the second phase will last from a day or two to many weeks, and *if the reaction to the third phase does not take place within ten days to two weeks, the surgeon should not under any circumstances be persuaded to remove the prostate*, because if he does the chances are very much in favor of a fatal outcome. In one of our cases a gastric uræmia developed on the third or fourth day and *it was impossible to remove the prostate for over five weeks*. At the end of that time the third phase of the phenomenon appeared and the prostate was removed without any shock to the patient, followed by uncomplicated recovery.

All clinical observers naturally realize that the different stages vary in many cases as to their extent and their duration.

Second Operation.—Transvesical prostatectomy. Under ether anaesthesia, the finger was passed through the suprapubic opening and without removing any of the sutures the prostate was enucleated in three minutes. Some packing of the prostatic pouch was necessary to control a moderate hemorrhage. There was no shock following the operation. Draining tube and packing removed in 24 hours and a Pezzer catheter introduced. The Pezzer catheter removed on the fourth day followed by uninterrupted healing of the wound and full restoration of function. Six months after the operation the patient is quite well and is urinating normally.

It seems quite evident to us that it was safer ten days after the primary operation to remove the prostate than it would have been at the time of the primary operation. With the blood-pressure of 170 instead of 220, with the kidneys relieved of the disorganization incident to retention of urine, and with a well-balanced functional activity, the prostatectomy could be undertaken without danger to the patient. In our series of cases the depression which occurs from the third to the sixth day has been so constant that it is a real factor to be reckoned with in all these cases, and it is our belief that no prostate should be removed until this period of reaction has been passed.

In some cases the second stage lasts two, three, four or more weeks. During this period after the suprapubic cystostomy all of the clinical features of the case preclude the possibility of a prostatectomy and not until a fully developed third stage appears should the prostate be removed. The following case in which the patient developed a gastric uræmia, and massive cedema of the legs, will serve as an example.

CASE II.—*Diagnosis: Obstructive hypertrophy of prostate; gastric uræmia.* The patient was admitted May 9, 1913. General health good. Considerable obstruction. No symptoms of kidney trouble excepting a slight amount of albumin which was present.

First Operation.—Suprapubic cystostomy; Pezzer catheter. May 10, 1913, operation quickly accomplished under local anaesthesia. The day following operation passed 24 ounces of urine, clear, large amount of albumin present; 26 hours after operation

began to vomit; 8 hours after operation hiccoughs began and continued intermittently for 24 hours. Second 24 hours urinary output dropped to 27 ounces, still clear; vomiting continued; urine almost solid with albumin. Third 24 hours some nausea, no vomiting. Fourth 24 hours vomiting recommenced. Hiccoughs lasted for 14 hours, quite restless. Urine became bloody, almost solid with albumin—29 ounces in 24 hours. Fourth day very sleepy, hiccoughs continuing, legs showed slight swelling, urine bloody. Fifth day slight hiccough, urine clearer, sat up. Patient showed a gradual improvement with the exception of the swelling in his legs, which increased so that both legs soon became very badly swollen.

Coincident with this no phenolphthalein test was made on account of the large amount of blood and albumin present. June 2, phenolphthalein test showed 30 per cent. excretion the first two hours; June 9, one week later, showed 22 per cent. excretion first two hours; June 15 showed 21 per cent.; July 1, phenolphthalein test showed the excretion to be 48 per cent. in two hours. The patient's general condition showed a coincident improvement, swelling of the legs entirely disappeared, the amount of albumin in the urine very greatly decreased so a further operation was deemed advisable.

Second Operation.—Transvesical prostatectomy. July 5, 1913. Suprapubic catheter removed and with the finger passed into the bladder through the suprapubic opening the prostate was easily removed. There was considerable hemorrhage which necessitated the introduction of packing. Reaction from the operation was very slight. Twenty-four hours after operation was sitting up in bed; 48 hours after operation the drainage tube was removed from the wound and Pezzer catheter re-inserted; 59 ounces were collected through this catheter during the 24 hours, with hardly any leakage. On the fifth, sixth and seventh days he evidenced some stomach irritability and vomited a little, but the attack passed off quickly. On the ninth day began to urinate a little. Wound healed promptly and the patient was discharged cured August 2.

It is not only the kidney and its function which must be considered, but it may be that it is the heart that is the weak link in the chain, and in order to ensure a safe operation the

third and fourth days very considerable cardiac insufficiency, pulse extremely weak, intermittent and general weakness (see chart, Fig. 28); temperature 101.8° , pulse 130, respirations 40. Under

FIG. 27.

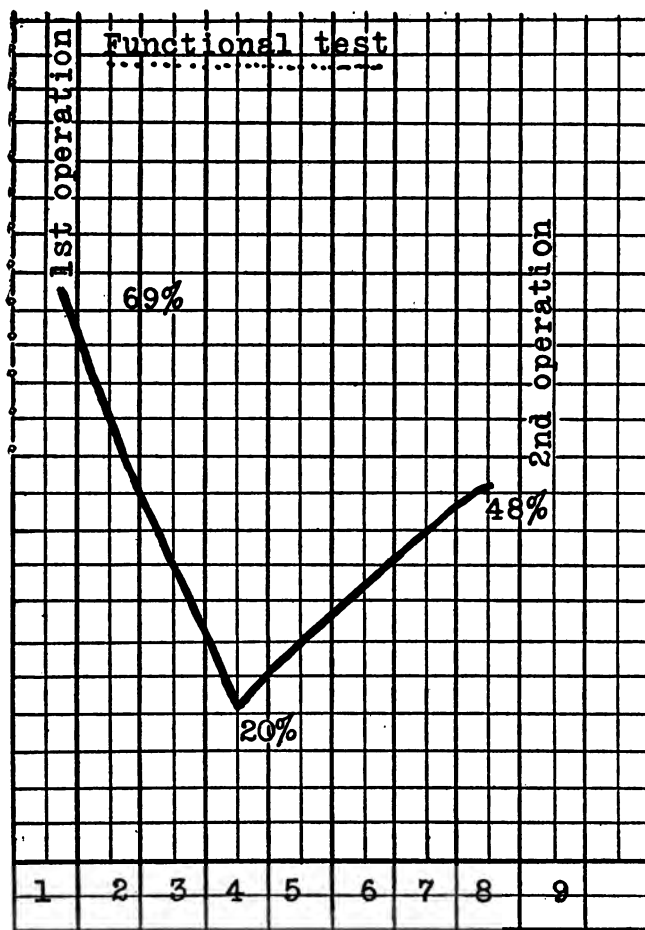


Chart showing drop in renal function during second phase from 69 per cent. to 20 per cent. (Case III.)

proper medication the conditions gradually returned to normal, which they reached on the fourth day. However, this chart will show the dangerous reaction following the operation which, if it had occurred coincident with the shock of the primary operation

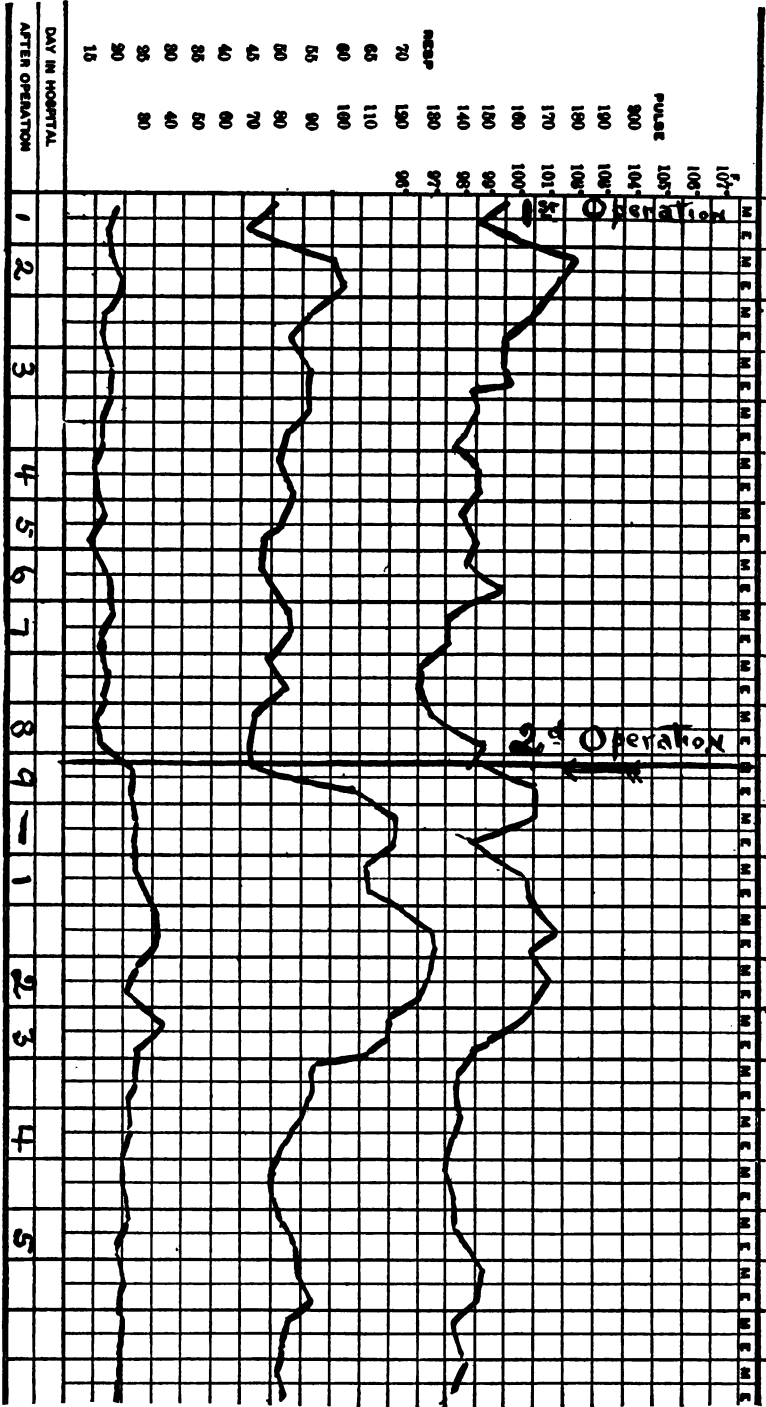


Chart showing pulse, temperature, and respiratory conditions in Case III.

FIG. 28.

with a very marked decrease in the renal sufficiency, the patient would probably have died on the second or third day. As it is the patient recovered entirely; he passed his urine by the urethra on the ninth day, and the wound was closed completely on the twenty-second day. His present condition is satisfactory.

As already referred to, in cases of enormous dilatation of the bladder with cedema of the legs, scrotum, etc., the three-phase cycle shows a remarkable curve when traced on the chart. The accompanying diagram, Fig. 29, shows the condition existing in a patient still under our care. During the first 24 hours the patient passed 249 ounces of urine, a catheter being used to withdraw the amount in small quantities and never emptying the bladder, that viscus being continuously dilated as high as the umbilicus. On the second day more urine was withdrawn at a time and the urinary output was 308 ounces, specific gravity 1002. Following the chart it will be seen that gradually the urinary amount decreased and that on the fourth day the bladder was completely emptied for the first time by catheter, the amount passed during the 24 hours being about 120 ounces. This modified second phase shows a preliminary rise and the enormous output of urine would unquestionably have overwhelmed the patient had a prostatectomy been done, or even a suprapubic cystostomy.

Fig. 30 is the pulse chart of the same patient and shows the remarkable effect the condition had upon the action of the heart. On the twelfth day the phthalein test showed a 40 per cent. output, but the pulse was extremely unreliable. Five days after the suprapubic cystostomy the phthalein test showed an output of 67 per cent. and the pulse at that time would not permit a prostatectomy. In fact, with a heart so badly damaged and a kidney which had been exposed to so much pressure, the date of the prostatectomy must be put off for some weeks.³ Other cases show only a mild degree of depression in the second phase and it would undoubtedly have been perfectly safe to remove the prostate at the first operation, but as yet I have not

³ Thirty-eight days after the cystostomy the prostate was removed and the patient has made a good recovery.

FIG. 29.

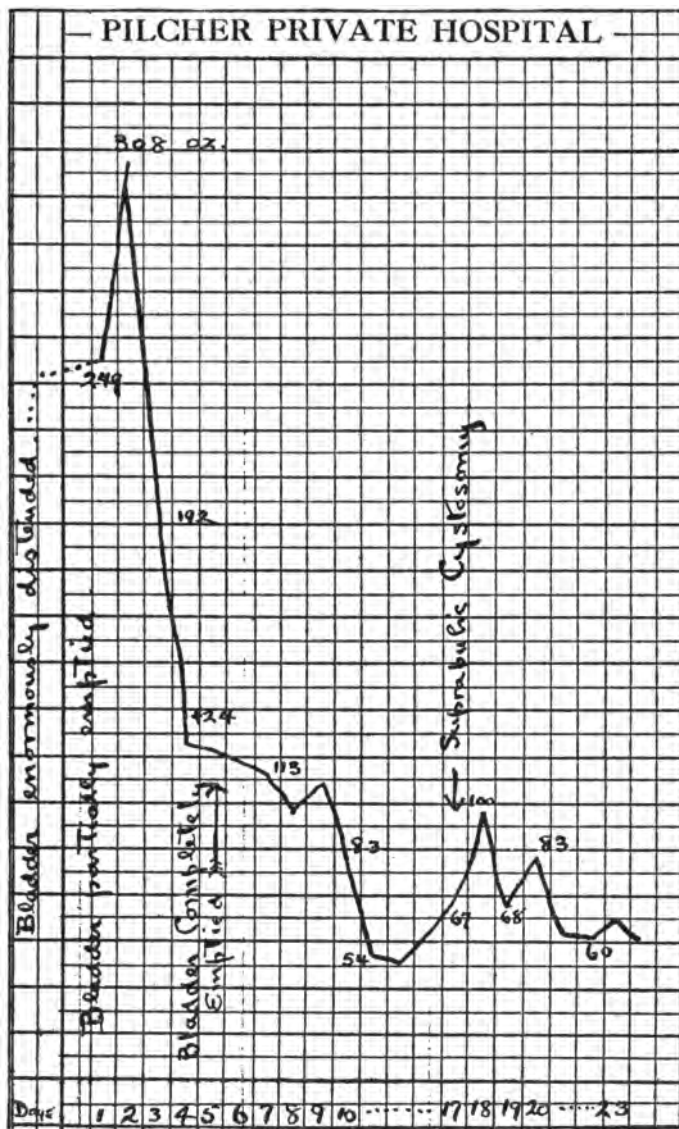


Chart showing remarkable first phase of chronic prostatism. Bladder distended above umbilicus. Patient in collapse. Partial decompression of kidney developed urinary output of 308 ounces of urine in 24 hours. The second phase showed a gradual drop in urinary output, with a very marked increase in the amount of albumin. Suprapubic cystostomy on twelfth day showed very slight reaction from kidney. For the first twelve days, urine was removed by catheter.

or fourth day, and third, the functional reaction of the kidney to this test at the end of a week or ten days. It is a mistake to rely entirely upon this test, especially before the cystostomy has been done. For example, the test may show excretions of more than 50 per cent. in the first two hours before the preliminary cystostomy, but the reaction may drop on the second or third day, after relief of the retention of urine, to below 15 per cent., which is a true index of the functional capacity. When, however, the period of depression is passed and the reaction returns to 50 per cent. after the retention of urine has been relieved, this then becomes a fair index of what we can expect the kidney to do after the prostate has been removed.

CATHETER DRAINAGE OF THE BLADDER.—There are some cases in which catheter drainage of the bladder must be used as a preliminary to the suprapubic cystostomy, such as cases where there is an enormous distention of the bladder with oedema of the legs, scrotum, and penis due to pressure. If a cystostomy is done and all of the urine is withdrawn at one time from the bladder, the shock and decompression of the kidney thus occasioned may bring on a fatal uræmia or a fatal hemorrhage. One such case was seen by the writer at the Jewish Hospital in Brooklyn where the bladder, which was enormously distended, was suddenly emptied; the patient promptly died. A second case under the care of the writer at St. John's Hospital, in which 72 ounces of urine was withdrawn from the bladder, was followed by a dangerous hemorrhage into the bladder.

1. *Indications for Catheter Drainage.*—Some operators prefer to use catheter drainage for a week preparatory to every transvesical prostatectomy. It is always indicated in cases where the residual urine amounts to 30 ounces or over.

2. *Dangers.*—Sudden withdrawal of all of the urine may cause death from shock, uræmia or hemorrhage. The presence of a catheter in the urethra may occasion infection, and in a number of reported cases death has followed its use.

3. *General Rules.*—If catheter drainage is established, the bladder should not be emptied all at once, but the urine grad-

usually withdrawn and, depending upon the amount present and the amount secreted by the kidney, the amount drawn should be regulated.

It is an interesting fact that the control of the amount of residual urine in cases of enormous distention of the bladder will regulate the output of urine through the kidney. In connection with these cases no drugs should be given to stimulate the heart or change its action until there is some very absolute indication for the same, for harm may be done, preventing the establishment of a normal balance, as the heart adjusts itself to the new conditions found in the kidney.

IV. SUPRAPUBIC CYSTOSTOMY.

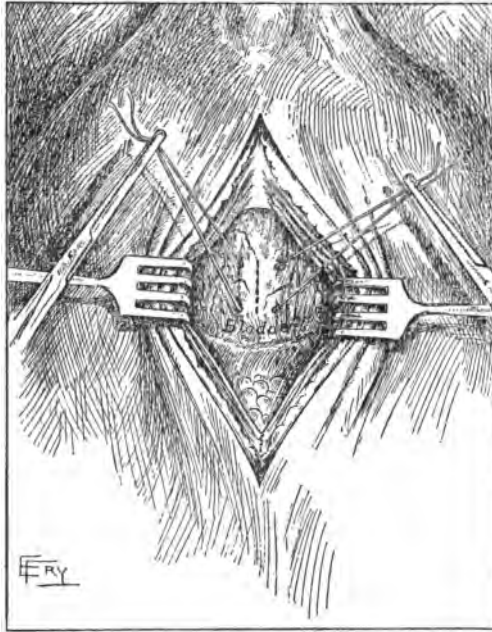
First step, preparation of the patient. Skin, usual iodine preparation. Anæsthesia, novocaine 2 per cent. by preference. Incision, vertical.

Technic of Operation.—Usual incision beginning just above the pubis is made through the skin and superficial fascia. The sheath of the rectus is divided in the median line, the recti muscles are separated, exposing the prevesical fat and fascia. The muscles are held apart by a specially devised retractor, modified from the Mayo-Collins appendectomy retractor. The advantage of this retractor is that the curved blades are in a straight line at the point where they enter between the muscles, and after they are entered they present a concave surface to the muscular face which they wish to retract, which keeps them from slipping out of the wound. Then the third arm of the retractor is placed later. When the prevesical space has been exposed, the finger is entered until it reaches the superior surface of the symphysis. With this as a landmark, the finger covered with gauze is used to strip the fascia and lymphatic tissue from the anterior wall of the bladder. It is often of advantage to have the bladder partially filled with water, for then it is somewhat easier to clean off the anterior surface of the bladder with the finger. This stripping away of the tissue with the finger is carried up to the peritoneal fold. The peritoneum is not disturbed unless it

reaches far down over the anterior surface of the bladder. If this is so, the peritoneum is stripped up somewhat. With the bladder surface freely exposed, the third arm of the retractor is placed over the bit of gauze to hold up the fat covering the peritoneal fold.

Securing the Bladder.—To hold the bladder in place a silverized catgut retention suture is passed through the wall of

FIG. 31.



Second step in the preliminary cystostomy. The bladder wall is seen exposed and the position of the incision is indicated near the fold of the peritoneum. The two stay sutures are in place and hold the bladder wall up. As soon as these sutures have been introduced the fluid is withdrawn from the bladder.

the bladder near the point at which the bladder is to be opened (Fig. 31). The water is then withdrawn from the bladder through the catheter and the bladder washed clean. Then holding the wall of the bladder out through the abdominal wound, a knife is thrust into the bladder. The knife is withdrawn and the finger enters the bladder and examines the interior of the bladder to determine the presence of stone or

any foreign body. A foreign body, if present, is then removed. The condition of the prostate and its conformation and general character is then studied with the finger. The only point at which the patient will complain of pain is when dragging on the bladder wall or when examining the bladder with the finger through the bladder wound. Examination of the interior of the bladder can be done quickly. The finger is then withdrawn and a Pezzer catheter is inserted into the bladder wound (see Figs. 32 and 33).

The Point at Which the Bladder is to be Opened.—Incision into the bladder is made as near the peritoneal fold as possible, for healing takes place more rapidly at this point, and when a fistula is formed, the urine enters the fistula less easily at this point.

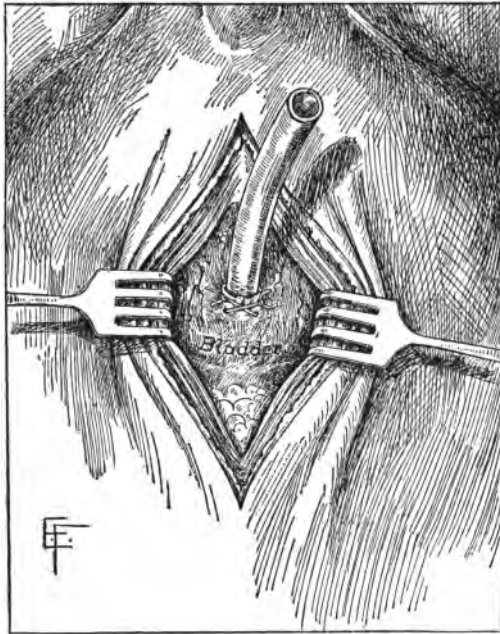
Draining the Bladder.—The Pezzer catheter, as mentioned before (Fig. 33), is fixed in the anterior wall of the bladder, then, using the same suture that was placed for the retraction suture, a purse-string is made in the bladder wall around the catheter. This suture is of catgut. It is tied, being careful to tuck in the muscular wall of the bladder around the catheter. This produces a slight spur in the interior of the bladder which, after the catheter is removed, favors early healing. This suture when tied insures a water-tight joint around the Pezzer catheter. The wound is then reconstructed. The prevesical space is carefully obliterated by the catgut suture. The fascia and muscles are sutured together with chromic gut. The skin is sutured with silk. In other words, all of the planes of tissue are brought together again in their natural position and the only opening is the line through which the catheter emerges. It is possible to do this in these cases because the joint around the Pezzer catheter is water-tight and there will be no leakage for over a week. The result is that *we have a primary union of the wound, a thoroughly drained bladder and the first step of our transvesical prostatectomy already completed.*

In any transvesical prostatectomy most of the time will be consumed in making the suprapubic incision and in closing

the same. By this method this step of the operation is already completed before the prostatectomy is attempted.

Whatever shock is going to take place from this encroachment on the urinary apparatus in cases of prostatic hypertrophy will become evident on the second to the fifth day after the suprapubic cystostomy. The *patient is in the best possible con-*

FIG. 32.



Shows the way in which the Pezzer catheter is fixed into the bladder wound,—the stay suture from one side being tied on the opposite side of the tube including some of the bladder wall, and the one from the other side tied in a similar manner. These will hold the tube firmly in place. A purse-string suture is used for the same purpose.

dition to overcome this shock because there has been no loss of blood, no general anæsthetic, and no special pain, all of which factors tend to decrease the resisting powers of the organism. Almost without exception in cases where there has been any great retention, there is a marked renal reaction which occurs during the first week, as previously noted. If this, then, can be eliminated as a factor of the prostatectomy itself, it seems to us that it is our duty to do this.

Two other methods have been devised as the first step of the transvesical enucleation. First, the use of a permanent catheter. This question has already been discussed (p. 528). The objections to it are: In the first place, it is most disagreeable to many patients; in the second place, it almost invariably excites a urethritis which frequently causes an infection of the epididymis, and sometimes affects the testicle. These are unfortunate complications. In the third place, fatal sepsis has more than once followed the using of a permanent catheter in old men with prostatic disease.

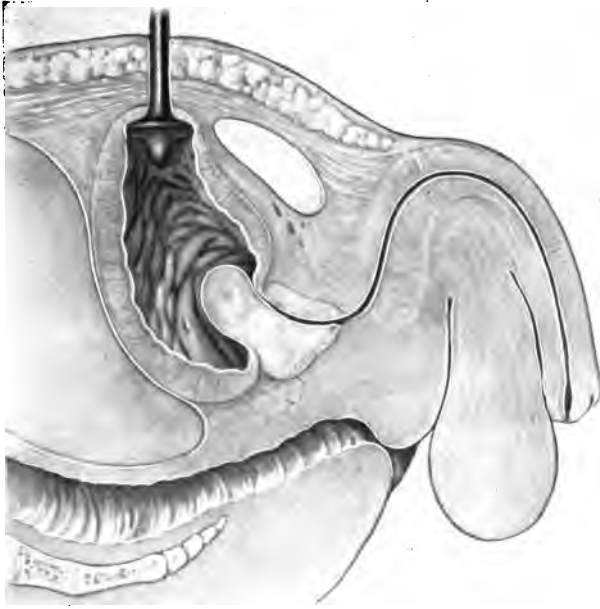
One method used as a substitute for the suprapubic cystostomy in emergency cases is the puncture with a trocar above the pubis. This is not without danger in the hands of some surgeons, to say the least, and it does not in any way shorten the major operation.

My chief argument, however, is that by doing a preliminary suprapubic cystostomy we accomplish everything that any of the other methods do; we are able to do it under a local anæsthetic; we have exposed the suprapubic tissues to infection and, if this takes place, which is a very rare occurrence in these cases, it may be overcome and will subside before enucleation of the prostate is undertaken. Again, as the result of the preliminary cystostomy, the œdema and swelling around the neck of the bladder, including the prostate, greatly diminish. I have seen the prostate diminish one-half in size after the suprapubic cystostomy alone. This is of advantage in the enucleation and the healing of the wound.

V. THE TECHNIC OF TRANSVESICAL PROSTATECTOMY.

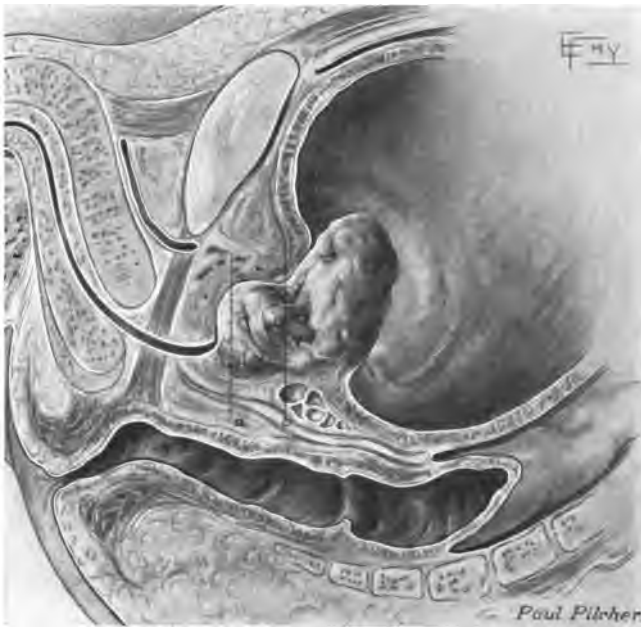
When it has been proven to the surgeon's satisfaction that the prostate can be safely removed, judging from the functional test of the kidney compared with the original functional test and taking into account the amount of urea excreted and the evidences of acute or chronic renal disease, as well as the general condition of the patient, as previously stated, the operation may be undertaken. The patient is prepared as for any other operation. When the dressings are removed, after

FIG. 33.



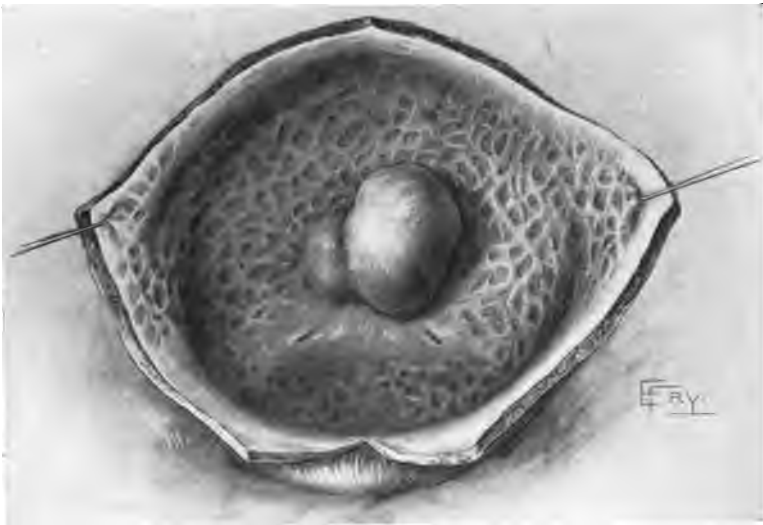
Pezzer catheter in place after suprapubic cystostomy. Button of the catheter fits snugly and is far superior to the ordinary drainage tube inasmuch as it does not permit any rough or sharp surface to irritate the prostate or the bladder wall. This idea was first suggested to me by Rovsing and is the method which he follows.

FIG. 34.



The surgical problem. The picture presented illustrates the average case of prostatic hypertrophy with a special development of the median lobe. It is shown to emphasize the bearing of the surgical pathology upon the choice of method of operation.

FIG. 35.

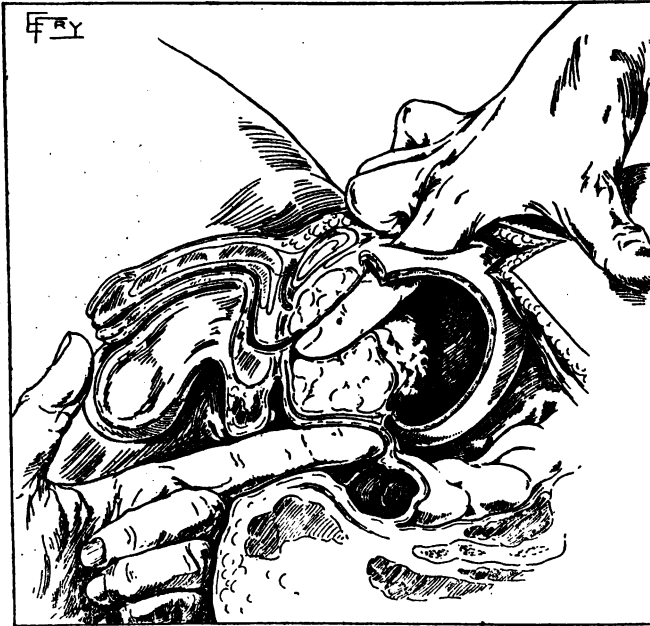


Illustrates a second view of the vesical aspect of a hypertrophied prostate showing the irregularity of the outgrowth and emphasizing the fact that the prostatic hypertrophy is a lesion of the bladder and not of the perineum.

the preliminary cystostomy using the Pezzer catheter, it will be found that the wound surrounding the catheter has healed by primary union. *The silk sutures are still in place. These are not removed,* for they are needed to hold together the recent wound while the finger is enucleating the prostate.

First step: The skin is prepared with iodine. The Pezzer catheter is removed and the *gloved finger* introduced into the

FIG. 36.



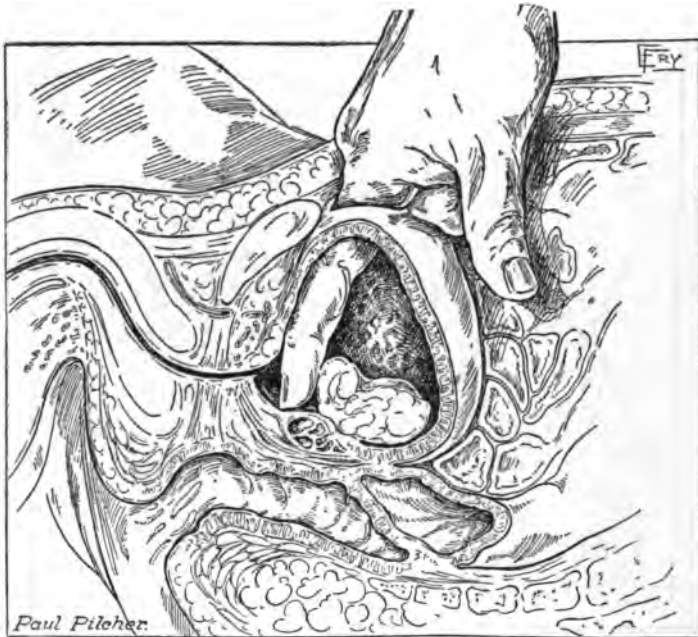
Transvesical prostatectomy. Enucleation of the prostate. Usual method. Finger is introduced into the urethra and advanced as far as possible before breaking through the urethral mucous membrane. Usually the line of cleavage is easily found from the urethra and the enucleation is accomplished as described in the text.

bladder through the suprapubic opening. This opening easily dilates sufficiently to allow free manipulation of the finger. The index finger of the other hand is introduced into the rectum and the prostate is lifted up.

Second step: Enucleation of the prostate. The index finger of the enucleating hand is introduced into the prostatic urethra and advanced as far as possible, reaching, if possible, the furthest point of the prostatic enlargement. This method,

as shown in Fig. 36, is especially useful in two forms of prostatic enlargement, that which is due to an irregular enlargement of both lateral lobes, and that which is due to enlargement of both lateral lobes and the median lobe, even though the median lobe be enlarged out of all proportion to the other two lobes, as in Fig. 3. With the finger in the prostatic urethra, the point of least resistance in the mucous membrane of the urethra is sought. Usually this will be found on the lateral or the antero-

FIG. 37.



Drawing illustrating one of the final steps in enucleation of the prostate. The lateral lobes have been freed and the mass together with the median lobe is being turned over and turned into the bladder, stripping up the mucous membrane of the bladder from the surface of the prostate.

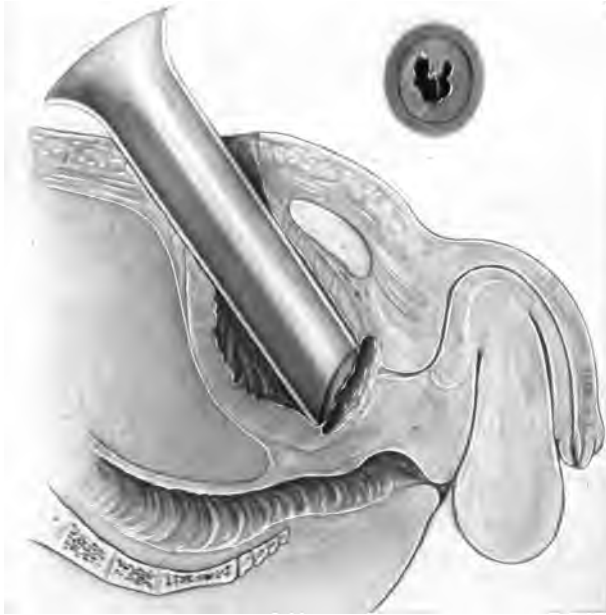
lateral wall of the urethra. At this point the division between the prostate and the urethra is usually quite easily broken through. In all of my recent cases I have been able to gain the line of cleavage through the urethra easily with the gloved finger. The finger after entering the line of cleavage sweeps, first, slowly around the distal portion of the growth, and then, up over the anterior surface of the growth separating it from

FIG. 38.



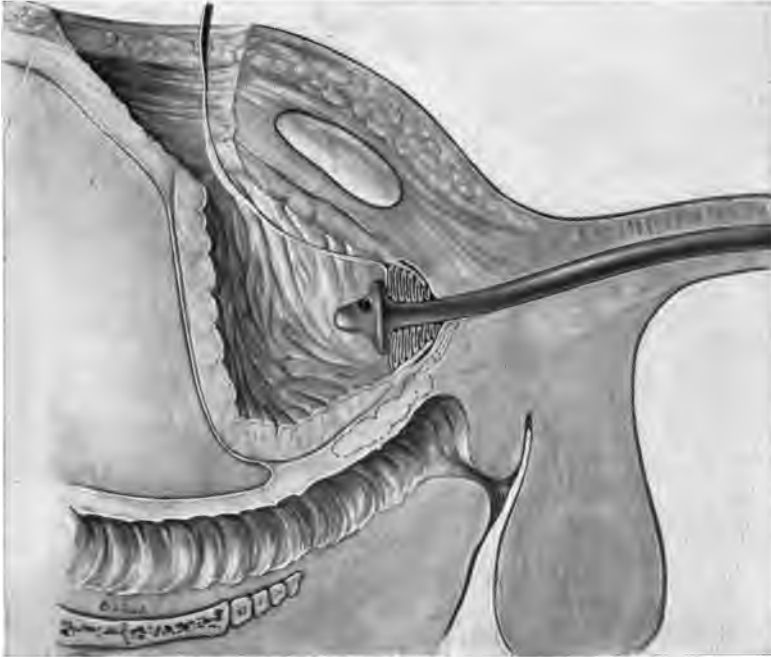
Under surface of prostatic mass showing the enormous median lobe and the small right lobe.
"A" shows the torn edges of the mucous membrane stripped up from posterior surface.

FIG. 40.



Illustrating the method used by Fenwick to control hemorrhage after prostate had been removed. Small picture in upper right hand corner shows condition frequently found for a small blood-vessel which seemed to be bleeding, contained in the torn edges of the bladder mucous membrane. Illustration shows the speculum in place with the neck of the bladder exposed, that the operator may directly clamp any bleeding vessel. This method in the hands of Fenwick is ideal.

FIG. 41.



Showing method of controlling hemorrhage by the use of packing. The Pezzer catheter is introduced by first passing a silver catheter through the urethra and out through the supra-pubic wound attaching the Pezzer catheter to the silver catheter and withdrawing same through the urethra. When the Pezzer catheter is in place, the packing is inserted, consisting of narrow gauze, introducing it in such a way that the torn mucous membrane flaps of the bladder are pushed ahead of the packing and when the packing is in place the Pezzer catheter is pulled down, keeping the packing in place and exerting pressure against the bleeding surface at the same time. In order to hold the Pezzer catheter firmly in place, it should be attached to the leg by adhesive plaster. The gauze is removed after 24 hours and the catheter at will.

FIG. 42.



Appearance of suprapubic scar two weeks after the operation. It is meant especially to show the clean appearance of the wound which is entirely free of incrustations or sloughs.

the prevesical tissue. The finger is then passed across the urethra to the other side with a sweeping motion of the finger and the opposite lateral lobe is freed. Then passing the finger up over the entire mass an attempt is made to turn the growth over so that it will easily turn out into the bladder carrying with it the median lobe (Fig. 37). That is to say, the finger is passed up over the two loosened lateral lobes and then beneath the same between the enlarged lobes and the rectum, and then

FIG. 39.



Drawing illustrating method of removing a massive hypertrophy of the prostate where the urethral enucleation is impracticable. This is applicable in the large bilateral hypertrophies. The illustration shows the finger raising up the sphincter, enucleating the prostatic mass in one piece.

the finger is pulled toward the bladder so that the growth will turn upon itself, as is shown more clearly in Fig. 37.

As the growth is turned out into the bladder, the bladder mucous membrane will be stripped up from the posterior side of it, as may be seen in Fig. 38. The point which is most difficult to free is the attachment at the junction of the prostatic and membranous urethra, which is seemingly a fibrous attachment, or may be the attachment to the atrophied posterior lobe which lies distal to the ejaculatory ducts and which prob-

This consists of introducing a catheter through the urethra which serves as a guide and centre around which the packing is to be placed. Then a narrow strip of gauze packing is introduced through the suprapubic wound and the torn edges of mucous membrane which have been stripped up from the prostate are pressed down into the shallow prostatic pouch and held in place by gauze packing, as is shown in Figure 41. This shows the prostatic pouch exaggerated with the torn flaps of mucous membrane pushed before the gauze packing and in addition the Pezzer catheter used to hold the gauze packing in place. This Pezzer catheter may be introduced by first passing a silver catheter through the urethra and out from the suprapubic wound and then attaching the small end of the Pezzer catheter to the silver catheter and drawing it out through the urethra. With the expanded end of the catheter on the vesical side of the packing, considerable pressure may be brought to bear, using a very small amount of gauze packing by pulling on the penile end of the catheter. Up to the present time we have always used the simple rubber catheter as a guide and centre around which to pack the gauze. The end of the gauze is led out through the abdominal wound (Fig. 41). Other methods of controlling hemorrhage by direct pressure have been devised, but none of them are superior to those which have been mentioned.

Control of Secondary Hemorrhage from the Bladder.—Hemorrhages occurring within 12 to 24 hours after the prostatectomy are best controlled by packing the prostatic pouch around a catheter introduced through the urethra. In one case the writer passed a silk suture through the perineum, placed a gauze packing over the prostatic pouch and fastened the silk suture to this gauze packing, tying the same on the outside of the perineum. Secondary hemorrhage which occurs a week or so after the operation may be either from the wound itself which calls for re-opening the wound and suture, or may be from the vesical neck or the prostatic pouch itself. Such an occurrence calls for re-opening of the bladder, exposure of the bleeding point and securing same either by suture, the actual

cautery or the high-frequency spark generated from the D'Arsonval current. In one case of my own, it was necessary after the second week to re-open the bladder widely and cauterize the entire area of the vesical neck before the hemorrhage could be stopped.

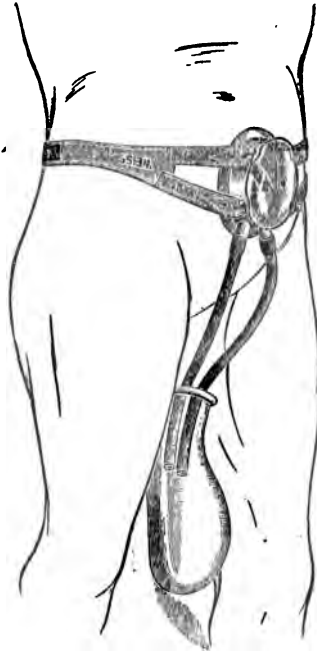
Drainage of the Bladder After Transvesical Prostatectomy.

—To the mind of the writer, it is very *essential to drain the bladder suprapubically after every case of prostatectomy*. We consider it dangerous and unnecessary to run the risk of closing the bladder after transvesical prostatectomy. This has been emphasized in our own experience in two cases in which we closed the bladder and were compelled to re-open and drain the bladder on account of severe hemorrhage within the bladder which clogged the urethral catheter. Our routine is, as soon as the prostate is removed and the hemorrhage checked, to introduce a large rubber drainage tube, one inch in diameter, just within the wall of the bladder, and after securing it in place to apply copious gauze dressings over the same. If the packing of the prostatic pouch is necessary, a small gauze packing is brought out through the large drainage tube. It should be emphasized at this point that none of the silk skin sutures introduced at the primary operation have been removed, and that after the enucleation of the prostate no suturing of the wound is necessary. The cystostomy wound made at the first operation is capable of very great distention without tearing it open if the original sutures have not been removed.

After-treatment.—As soon as the patient has been returned to his bed a proctoclysis of tap water is begun and the abdominal dressings changed as frequently as necessary. *After 24 hours* the bladder is irrigated through the suprapubic tube which is still in place. If packing is in place it is removed, together with the large suprapubic drainage tube. The Pezzer catheter replaces the suprapubic drainage tube. It will be found that in six to eight hours the bladder wall will contract around the Pezzer catheter and very little urine will leak out beside it. The Pezzer catheter is left in place for three or four days until the wound surfaces have healed over. This tends to pre-

vent the formation of sloughs and phosphatic concretions on the wound surfaces (Fig. 42). Also, the use of drugs to prevent alkalinity of the urine will tend to give a better wound. *On the fourth or fifth day* the Pezzier catheter is removed and is replaced by a collecting device of an English maker, which is shown in Fig. 43. The wound is strapped with a piece of inch-wide adhesive tape and what urine escapes is

FIG. 43.



collected in the celluloid cup and drains from the cup into a bottle through a rubber tube. This ingenious device is held in place by rubber straps which keep it from slipping. It is a very convenient and comfortable adjunct to the convalescence. If the suprapubic cup is not available, the use merely of masses of absorbent gauze over the fistula will answer any need until the fistula closes and normal urethral urination is re-established.

The period of healing of the suprapubic wound has in our experience taken from one week to four weeks, *the average be-*

ing about 16 days. In none of our cases has there been any permanent suprapubic fistula. The nearest approach to it was in the case of recurrent secondary hemorrhage in which the bladder was twice widely opened in order to control the hemorrhage. In one case the suprapubic wound closed in four days.

Control of the Urine.—About the eighth to tenth day, as a rule, small amounts of urine will pass *per urethram*, the amount increasing as the suprapubic wound contracts. It is worthy of note that in none of our recent cases has dribbling been noticed, and that within two or three weeks after the operation the patients have fairly good control, and in all the cases operated upon by us after this method the result has been full control of the urine with complete emptying of the bladder.

Potency of the Male.—This operation does not seem to interfere with the functions of the ejaculatory ducts, in fact, in a number of instances the potency has increased as a result of the operation.

CONCLUSIONS.

Studies of the living pathology of chronic prostatism lead us to the conclusion that obstructive prostatic hypertrophy usually involves the two lateral lobes and the median lobe, and that inasmuch as the obstruction is at the neck of the bladder and the obstructing body projects into the bladder, the natural avenue of approach is the transvesical route.

Second, as a result of relieving the distention of the bladder, three phases of kidney secretion are demonstrable; the second phase, lasting from a few days to a number of weeks, constitutes a period of danger during which no surgical attack should be undertaken.

Third, the technic advocated in the present paper includes a two-step transvesical operation in every instance for the relief of benign hypertrophy of the prostate. Preliminary cystostomy is preferred for the reason that, following the suprapubic cystostomy the patient is out of bed in 24 hours; the urinary output from the bladder is completely controlled; there is no unpleasantness or traumatism due to the passage of

the catheter through the urethra, and the operation of trans-vesical prostatectomy is already half completed.

Fourth, since applying these principles we are able to report to date 28 successive successful cases, every case resulting in the control of urine by the patient and his ability to empty the bladder without using a catheter. In some cases of enormous distention of the bladder, it is necessary to catheterize for a certain length of time before employing suprapubic cystostomy on account of the extreme back pressure on the kidneys, the sudden decompression of which might result fatally.

Fifth, these same rules do not apply in cases where carcinoma of the prostate has been diagnosed, or even where its presence is fairly well suspected. A later communication will deal with this part of the subject.

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APPENDIX H.

INFLUENCES THAT MAKE FOR PROGRESS.

INFLUENCES THAT MAKE FOR PROGRESS.*

BY LEWIS STEPHEN PILCHER.

MR. TOASTMASTER:

The medical profession of Brooklyn has not forgotten the privilege which it enjoyed a year and a half ago through the kind offices of the University Club of meeting certain of the masters of modern medicine. We appreciated the opportunity that was ours then, and this community has ever since been richer for that evening; men who before had been little more than names to us have been real personalities ever since, and we have had a keener, more personal sense of sharing in their achievements. Such an affair as that was, such an affair as this gathering this evening is, is like a personally conducted tour through strange lands, giving those who share in it wider horizons, newer thoughts, higher aspirations. None of us wishes to be provincial. We aspire for knowledge and interests that extend beyond our front door-yard. From the beginning of recorded history men who were impatient of the narrowness of their own petty domain have broken from it and found in wandering in distant lands supreme satisfaction to their mental unrest. The student of the Middle Ages understood this well. What a picturesque and instructive figure he is as he wanders over Europe from University to University eager and turbulent, thirsty for knowledge, inciting to the very best work the teachers in whose halls he tarried, and gaining enthusiasm and breadth of vision from diverse sources.

As a notable example of this training, there comes to my mind the career of one who just 401 years ago this April was born in Belgium and began his studies in the University of his native country, at Louvain; thence directed his steps into Germany at Cologne, thence into France, first at Montpellier and

* Remarks made at the University Club of Brooklyn, "Physicians' Night," April 11, 1914.

later to Paris. Later still he reached Italy, where he taught at Padua, Bologna and at Pisa. Out of such a training was developed a genius who broke the shackles that had bound medicine for more than a thousand years, shattered the Galenical idol of infallibility, and established a model for anatomical description and depiction which has never been surpassed. You recognize the picture at once as that of the great Vesalius, of whom I speak.

To my mind one of the most hopeful and promising indications of the present day conditions in medicine is to be found in the increasing practice of professional pilgrimages which prevails among the medical men of to-day. Our medical conventions, congresses, and associations really belong to the University Extension system, and the eager medical men who throng to them are animated by the same spirit as that with which were imbued the peripatetic students of four or five hundred years ago.

A more powerful influence for good comes to a man when he is privileged to cut loose from his own work, from his own country if possible, and put himself for a time, however brief, in personal relations with one of the Masters of Medicine. I speak whereof I know. I do not know how to attempt to estimate the value on my own life of the opportunity, brief as it was, which I enjoyed nearly forty years ago, of seeing work and hearing speak Langenbeck, and Billroth and Virchow, and later Esmarch and Volkmann and Thiersch and Lister and Sir James Paget. These lived in an heroic age. They were pioneers who created the conditions out of which has developed the Surgery of to-day. But who now can bend the bow of Ulysses! With all my tendencies to hero worship, however, I do not wish to be considered as suggesting that the days when those men lived were any better than the present days. There never were any "good old days"! The real Golden Age is always in the present, only our eyes are holden that we do not see it. In what age could have been assembled at one board such men as grace this table this evening—Carrel, who has already been crowned with the Nobel prize, who in his physio-

logical surgery has developed a perfection of method and a skill of technic that have enabled him to penetrate to regions where none of us dare follow, and to achieve results in the surgery of the heart and blood-vessels that are the despair of the rest of us; Charles Mayo, whose work in goitre alone has attained a volume and perfection that was never dreamed of thirty years ago; and Murphy who in the single field of the surgery of the bones and joints has attained phenomenal results, the methods of which he gives to all for the benefit of humanity; and Hartmann of Paris, and Nicolaysen of Christiania, Primrose of Toronto, and our own Nancrede and Moore and Guthrie, each of whom is daily illustrating in an important way the possibilities of surgical teaching and practical work.

APPENDIX I.

BACK IN '88.

BACK IN '88.*

BY LEWIS STEPHEN PILCHER.

UPON such an occasion as this, the atmosphere charged with kindly feeling and in a special degree with an appreciation of the part in a hospital world which its medical staff should play, it is proper and quite to be expected that a speaker should have first in his thought what may be called the medical spirit, that is, that peculiar spirit which is fundamental in the medical life and essential to the proper development of a physician's career. I am not going now to a discussion of it in any detail,—that I have done in another place. I do, however, want to emphasize here this phase of it, viz.: that the medical spirit is peculiarly an altruistic one. It is to be noted, however, that this altruism belongs peculiarly to this world, distinguishable in this respect notably from the clerical spirit, which is also altruistic, but with an altruism relating chiefly to another world,—the spiritual.

The two kinds of altruism, the worldly and the spiritual, ought to go together, but they do not necessarily march in companionship. So true is this that it has almost become proverbial, so that men have learned to feel that the louder the professions of spiritual altruism are made, the greater the necessity for scrutinizing closely the possibility of the presence of a minimum amount of worldly altruism.

Be that as it may, there is one ground upon which the two kinds of altruism are surest to find their highest and most harmonious development. It is upon this ground that we stand to-night,—the founders, the supporters, the friends of the Norwegian Hospital and the medical men who for twenty-five years have labored as physicians and surgeons in its wards.

I can conceive of no more perfect or beautiful manifestation of the harmonious union of the two kinds of altruism than

* Remarks made at the Complimentary Dinner given by the Norwegian Hospital to Dr. H. B. Delatour, January 16, 1915.

to state. That you have appreciated him is evident in that for twenty-five years you have retained him as your chief surgeon.

Perhaps, however, it would be better to put it in another way—how well you have appreciated the good fortune which was yours in that the services of such a man were at your control, you have shown by your continued reliance upon him throughout this long period. You have turned deaf ears to any suggestion of any change which should in any degree lessen his opportunities for usefulness among you, and thus you have strengthened him in his work and have yourselves reaped an ever-increasing advantage as an Institution. I know of no other Institution in Greater New York in which there is any parallel. That you have done well, who shall deny?

. . . And now, my dear Colleague, nothing could give me greater pleasure than the opportunity at this moment to add a leaf to the laurel chaplet with which these, your friends here assembled, now crown you.

It is one thing to begin a race—it is quite another thing to complete it. Far be it from me, however, to suggest that you are now completing your race. It is only the first lap of the course, and we are all confident that the best and most fruitful years of your life are before you. We have stopped but for a moment to look back upon the achievements thus far, and from them to take courage for the future.

When you were beginning this race it was my great privilege to be one of your chiefs. You were then a great help and an inspiration to me. I hope that I may have been able to impart something of enthusiasm and guidance to you. At all events, during all the years that have elapsed since then, I have rejoiced at every step in your progress—"You have been the strong man to run a race."

All the marks of esteem and honor which your friends and your colleagues may shower upon you at this time are fully deserved.

To it all I wish to add my signature and to express my heartiest wish for your future welfare in the old-fashioned words—May you live long and prosper and may your professional shadow never grow less.

APPENDIX J.
THE VESALIAN SPIRIT.

THE VESALIAN SPIRIT.*

BY LEWIS STEPHEN PILCHER.

To most physicians of the present day Vesalius is a name and a shadow. Even though one may have a reverence for the past and an anxious desire to familiarize himself with the workers of former ages whose labors have furnished the foundations upon which the structures of the present have been laid, to but few is given the opportunity of gratifying their desire to become in any degree familiar with them as individuals, or to handle and know the volumes which embody their work. Such was my condition in 1880 when a fortunate conjunction of affairs made me a guest of Dr. George Jackson Fisher, of Sing Sing, New York. Fisher was then a man between fifty and sixty years of age. For thirty years he had been a practitioner of medicine in the village of Sing Sing, a beautiful suburb and residence town on the Hudson, some thirty miles above New York. Fisher united in a rare degree that thoroughness and kindness and versatile capability of adapting himself to every emergency of life which we love to depict as characteristic of the American country doctor. He not only administered to the physical needs of the countryside, but was guide and authority in all the civic and domestic affairs of the vicinity. He was a man of wide sympathies and interest in every question which affected public life. He had the faculty of being interested in everybody and everything, coupled with the yet more rare faculty of making himself interesting to every one and every circle in which he mingled. An enthusiast himself in many lines, he never failed to awaken like enthusiasm in others. Fisher was a born collector and on his premises he erected a separate museum building in which he had assembled collections

* An address delivered before the Harvard Medical Historical Club, Boston, Mass., December 8, 1914. Reprinted from the Boston Medical and Surgical Journal, Dec. 31, 1914.

of various kinds, such as might come within the possibilities of a country doctor. The lower floor of this building was devoted to his library and here at the time when I first came into close contact with him I found that he had brought together a notably large and rich collection of the medical classics. Here, under the guidance of Fisher, I myself first became really acquainted with Vesalius. With pride and enthusiasm, he placed in my hands the magnificent folios of the *Fabrica* of Vesalius of 1543 and of 1555, and during the remaining years of his life, which were all too few, he remained as guide, mentor and friend to me in my excursions into the domain of medical antiquarian lore. I take great delight in paying this tribute to his memory at this time. For twenty-one years now he has slept with his fathers, and his books, after a brief stay in the possession of the Vassar Hospital of Poughkeepsie, have now received a final appropriate resting place in the magnificent library of the Medical Society of the County of Kings of Brooklyn. Since that time the cult of Vesalius has been one of unflinching interest to myself. One by one I have been able to gather upon my own shelves copies not only of the magnificent volumes which were planned and issued by Vesalius himself, but also of many of the less imposing publications of his immediate predecessors and contemporaries and of his successors and imitators. These Vesaliana to me form a most interesting group of books, illustrating the most important and fruitful epoch in the development of positive and accurate anatomical knowledge.

My visits to Fisher resulted in a series from his pen of most valuable and characteristic sketches of the old Masters of Anatomy and Surgery. The first of this series was devoted to *Andreas Vesalius*. The beginning of this first sketch and of each one of its successors in the series was marked by a reproduction of one of the most interesting initials with which each chapter of the immortal *Fabrica* of Vesalius himself was introduced. It was a plan of Fisher, in preparing these sketches, that ultimately they should be gathered together into a book, but death overtook him before he could carry out his

plan. His successive sketches were devoted respectively to Vesalius, Paré, Eustachius, Colot, Fallopius, Tagliacozio, Columbus, Wiseman, Fabricius ab Aquapendente, De Chauliac, Harvey, Eucharius Rhodion, Hippocrates, Servetus, Herophilus and Erasistratus, Galen, Mondino, Rhazes, Celsus, Avicenna, Haly Abbas, Albucasis and Avenzoar. As the list is repeated, one appreciates at once the extent and value of the series. I have sometimes wondered whether the enterprise of some of our organizations devoted to medical history might not be wisely directed to the issuance of these sketches in an appropriate volume, a volume which not only would be of value for the information which it would place at the disposal of English-reading physicians, but also would be an appropriate memorial of a typical American surgeon who was one of the most conspicuous leaders in developing a taste among American practitioners for medical antiquarian lore. In the same class of medical antiquarian virtuosi, among those no longer living, deserve to be mentioned Oliver Wendell Holmes and David Hunt of Boston, John Watson and Samuel S. Purple of New York, J. Foster Jenkins of Yonkers, Beriah A. Watson of Jersey City, Stockton Hough of Trenton, Samuel Lewis of Philadelphia, Nicholas Senn of Chicago and John S. Billings of Washington. But *primus inter pares* stands the name of George Jackson Fisher.

It is interesting to note the ultimate fate of the collections of books which individual collectors gather together. The books of Holmes, are they not still preserved on the shelves of the Boston Medical Library, where they were placed by their collector while still in life? The books of Hunt, after the death of their collector, were dispersed at auction. The books of the Library of the Surgeon-General's office at Washington constitute a great monument to the energy and breadth of vision of Billings. The collections of Lewis form an important part of the library of the College of Physicians of Philadelphia, and here, too, drifted the books gathered by Stockton Hough. The books of John Watson for many years were the most conspicuous ornament of the library of the

piracy of the work of Vesalius, and the Latin text which accompanied the plates was nothing but a copy of the Epitome of Vesalius. To these plates, however, attaches a special interest, since they are esteemed by experts to be the first copperplate work executed in England. The book was dedicated to Henry VIII, following the example of Vesalius, who dedicated his book to his Emperor, Charles V. In 1555 a second edition of the Geminus plates was published, with an English translation of the text, thereby placing at the disposal of English students the anatomical teachings of the great Master. Already impressions from the same plates had been transferred to Germany, where they appeared at Nuremberg in 1551, with a German translation of the Epitome by Jacob Bauman. These Geminus plates continued to do further duty for some time. In 1564 a new issue was published at Antwerp with Latin text, and in 1569, having been acquired by André Wechel, the Parisian publisher, they again appeared, accompanied by the Epitome of Vesalius translated into French under the title of *Les Portraits Anatomiques de Toutes les Parties du Corps Humain*. Some years earlier, however, Ambrose Paré in his *Anatomie Universelle du Corps Humain*, which was published in 1561, copied the Vesalian figures and the Vesalian text. For these Paré gave Vesalius proper credit, speaking of Vesalius in terms of the highest commendation.

At the time that Paré was making the work of Vesalius accessible in the French tongue, the Spaniard, Valverde, was performing the same service for Spanish and Italian-speaking students. Valverde also had the plates of Vesalius copied upon copper, but the engravings were much smaller and inferior from an artistic point of view to those of Geminus. The work of Valverde had no merits of its own, both plates and texts were almost identical with that of Vesalius. It had, however, the merit of widely enlarging the territory into which the work of Vesalius was extended. Valverde's original *Historia de la Composicion del Cuerpo Humano* was published at Rome in 1556. The Italian translation, *Anatomia del Corpo Umano*, appeared in 1560, and in 1589 Columbo translated it back into

Latin and published a new edition with additional plates. These plates of Valverde appeared again and again in subsequent books, often associated with republication of the Epitome of Vesalius as an accompanying text.

Thus, before Vesalius died his work had become the common possession not only of the learned of all Western nations, but also of the much larger body of men who knew nothing beyond their own vernacular. Truly, he was the creator of anatomy as the real handmaid of surgery and of medicine. I do not mean to undertake here a critical appreciation of the work of Vesalius. It has been done many times. The scholarly volumes of Burggraeve, of Roth, and the recent admirable tribute of Ball, are accessible to all and give in detail the conditions and results of the work of this remarkable man. Suffice it to say that he broke the Galenical fetters by which knowledge of the framework of the human body had up to that time been bound. The overshadowing influence of Galen in all things pertaining to medicine up to the time of Vesalius I suppose it is difficult or impossible for one living in the present day to understand. But Vesalius was an iconoclast; what his own eyes saw and his own hands dissected, that and that only was he willing to set down. How different his predecessors and his confrères, all of whom confined themselves largely to repetitions, or paraphrases, or commentaries upon what Galen had already recorded. If their own observations chanced to differ from what Galen taught, so much the worse for their observations, which must be made to agree with Galen. I do not wonder that his old teacher, Jacobus Sylvius, "*Medicae rei apud Parrhisios interpretem Regium*"—equivalent in these days to "Regius Professor of Medicine in Paris"—protested with vehemence against the vagaries of his old pupil, whose headstrongness and contempt for authority had probably given his teacher many a bad quarter of an hour when he had sat under him in Paris. It is recorded that Sylvius was both a very positive and a very bad-tempered man and considered himself the High Priest of Galen! He made a full showing of his

personal peculiarities in the diatribe which he issued in 1551¹ against the teachings of Vesalius, whom he spoke of—making a play upon the spelling of his name, as Vaesanus-madman, instead of Vesalius. Poor old Sylvius (*Jacques Dubois*), he left nothing of any worth behind him, although he was a voluminous writer. We think of him now chiefly as the miser who kept himself warm in winter by playing handball to save himself the expense of a fire in his room. I am not sure, however, that I do not sympathize somewhat with him in his feeling toward the young upstart in Padua. You can hardly expect an elderly man to see with equanimity a younger one, whom he has taught, abandon the teachings of his preceptor, and as the representative of a new learning supplant the old in the regard of men! Vesalius himself displayed the same trait of human nature toward his own pupil, Columbus, when he spoke of him as “an uneducated man,” “a half knower,” who had learned from himself something in anatomy,² because Columbus ventured to disagree with him in some things.

As we read the records of the time, we are struck by the new spirit which Vesalius exemplified. In him it seems to have been developed *de novo*, for he certainly did not imbibe it from his teachers or his fellows. The spirit of independence and of enthusiasm in the pursuit of an ideal was awakening in many places and among many classes of men in the first half of the sixteenth century. The Erfurt monk, Luther (1483–1546), during the very years in which the Belgian youth, Vesal, was the most intensely interested at his work, was himself on fire with the flame of reforming zeal, as he denied the authority of Rome and preached justification by faith. In France, a young barber surgeon of Laval, Ambroise Paré (1517–1590), in 1543, when the first edition of the *Fabrica* was issued, had just come back from the wars to begin in Paris that illustrious career which was to continue among many vicissitudes for fifty

¹ Sylvius: *Vaesani cujusdam calumniarum in Hippocratis Galenique rem anatomicam depulsio*. Basileæ. Ex officina Jacobi Derbilleij, MDLVI, 16mo, p. 118.

² Roth, p. 182.

years and to earn for him the title of the Father of French Surgery. At Florence and Rome, while Vesalius was doing his work at Padua, and during the later years while his spirit was rusting out under the influences of life at an imperial court, was raging and driving to the accomplishment of tasks of incredible magnitude and excellence that incarnation of energy and varied ability, *Michel Angelo* (1475-1564), sculptor, painter, architect and poet. What a wonderful quartet is this—*Luther* in religion, *Michel Angelo* in art, *Paré* in surgery, and *Vesalius* in anatomy; all contemporaries, the products of the new birth of civilization which attended the close of the fifteenth and the beginning of the sixteenth centuries. To the modern physician, however, the peculiar qualities displayed by Vesalius must have a special charm and honor. To energy and enthusiasm he added a contempt for authority and a demand for personal demonstration, which are the foundation of the scientific method in all ages. No labor was too severe, no peril too great, to deter him from putting an alleged fact to the test of his own scalpel and of establishing or refuting by his own knowledge what claimed to be truth.

Vesalius, however, was a man as well as a scientist. I never have been able to form a clear idea of just what was the sequence of events in his career upon his return to Padua in 1544 from Basel after his absence of a year in superintending the publication of his *Opus Magnum*, the *Fabrica*. It would seem, however, that the Galenists who controlled the University were too powerful for him, and that Padua had no further use for him! During his absence his old pupil, Realdus Columbus, had become too firmly intrenched in the department of anatomy to be dislodged. Vesalius left Padua, and Padua lost the most brilliant star that ever shone in the firmament of its University. During the following year he gave a course of anatomy at Pisa and Bologna, but declined to accept the chair that was offered him at Pisa. Sick of disputes and arguments, in a moment of supreme disgust he threw his accumulated manuscripts into the fire and accepted the position of physician to

the Emperor, Charles V, which was tendered him! Thus passed out Vesalius the anatomist in the thirtieth year of his age.

Nearly twenty years later, after a career of success and distinction in attendance upon princes and nobles, he wrote to his friend, Fallopius, who now occupied his old chair at Padua, in acknowledging the receipt of a copy of Fallopius' *Observationes Anatomicae*, which the latter had sent to his old master, as follows:

"Although now I have never a chance of dissecting and can scarcely obtain possession of a skull, nevertheless I still retain the hope that opportunity may yet be afforded me of perusing that work of truth, man's body."³

Alas, this hope was never to be realized. It was buried a few months later on the desolate island of Zante, with the wasted body of a returning pilgrim from the Holy Land, all that was left of Vesalius, the enthusiast, the incarnation of energy, the seeker for truth, the beacon-bearer lighting up and pointing out the way in the investigation of the fabric of man's body, in which all later generations of men should follow.

We have met to celebrate the four hundredth anniversary of the birth of Vesalius. Men still cherish his fame; the farther the year of his birth recedes the greater in the perspective of the ages does his work loom up. But after all, it is not so much what he did,—other great anatomists have lived and worked since that time,—but the spirit which he exemplified and perpetuated, that counts. We do well to honor his memory by such assemblies as this. We do best of all if into our own work we incorporate somewhat of that spirit of inquiry, industry, boldness, zeal, energy, breadth of vision, doubt of dogma, insistence upon demonstration, which the world acknowledges to have been the peculiar characteristics of the Vesalian Spirit!

³ Preface to Examen. Fallop. Anat. Observat., Venice, 1564.

